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Light Colored Copal Varnish.

Take one pound of pale African copal, fuse t in an iron pot, then add a quart of clear hot linseed oil; stir well, then boil until the mixture is stringy. When cool, add two quarts of turpentine and mix well.

Improved Force Pump.

Force pumps in which the piston rod passes through the air chamber, are to some extent objectionable, because the air, after a time, escapes from the chamber through the water and packing, and the pump must then be opened so as to admit a new supply. This objection is entirely removed in the present improvement. The inventor provides the air chamber with a tube, through which the piston rod moves without coming in contact with the contents of the chamber.

In the engraving A is the air chamber, B the tube which separates the piston rod, C, from the air chamber. D is a cup, which receives the lower end of the tube, B; E E is the water line in the chamber; the cup is always below the water, and is thus kept tight, so that neither liquid nor air can ever reach the piston rod from the air chamber.

Another valuable feature of this pump is the cheapness with which it is constructed.—The shell, F, is all cast in one piece, and requires little or no machine finishing; the same may be said of the bed plate, G, and valve plates, *e e e;* in fact, almost the only part that need to be placed in the lathe is the pump barrel, I.

The operations of this pump are as follows:—When the piston rises, the water enters through supply pipe, M, and valve, *f*, into the pump barrel, I. Any water that remained in the pump barrel above the piston, is, by the rise of the piston, forced out through valve *g* into the exit nozzle, J, as shown by the arrow.

When the piston descends the valve, *f*, closes, valve *h* opens, and the water is forced up out through the nozzle, as indicated by the arrow at valve *h*. The descent of the piston causes a vacuum above, valves *f g*, are closed and valve *i* opened; the water rushes in through valve *i* to fill the vacuum; thus a double action of the piston is obtained, which both lifts and forces in its ascent and descent.

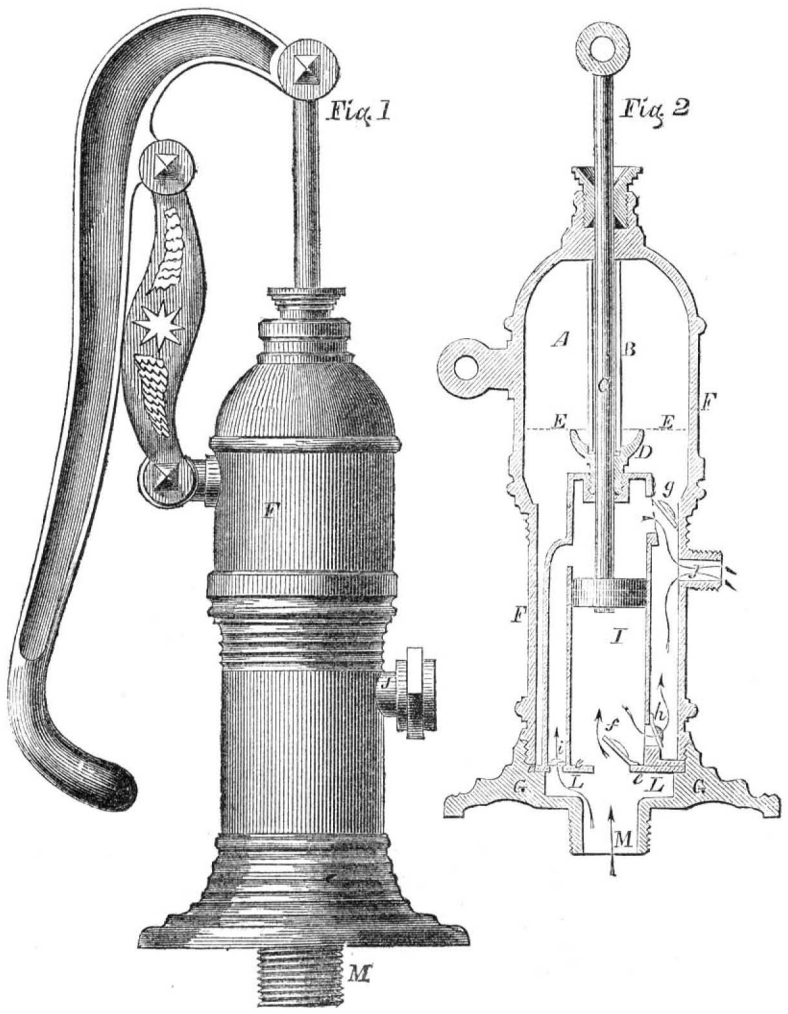
The bottom valve plates, *e*, it will be seen, are detached pieces, yet they are held firm by the combination of the bed plate, G, and shell, F; being thus detached, the valve plates and valves can be fitted much more easily and cheaply than if the whole pump had to be handled; the necessity of a dry sand core in order to form the water chamber, L, is also avoided, and the casting cheapened.

The working parts of the pump are nearly all under water, whereby they are rendered more than ordinarily tight and effective; the water is also received and transmitted in a very direct and effective manner, the openings being all of them easy and liberal; violent agitation and unnecessary movement is thus done away with, and the motive power required to raise the water is lessened.

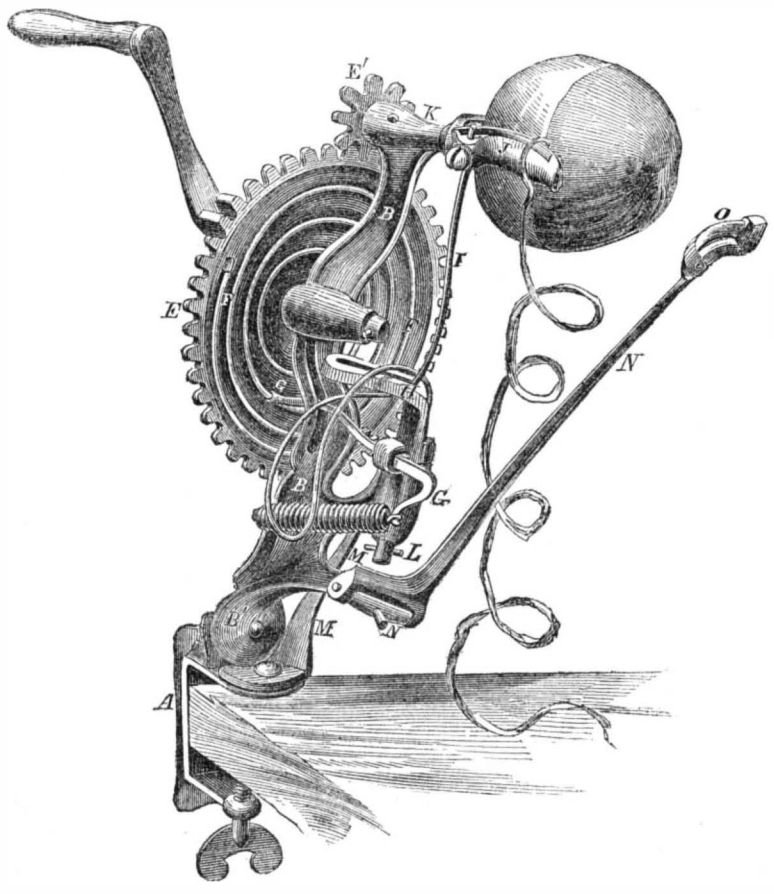
This pump strikes us as being one of unusual excellence. It is simple, and yet, apparently very effective. Large pumps of this kind could, we should think, be made very cheap, and we see no reason why they will not prove, in use, to be equally as effective, durable, and economical of power as any of the more costly pumps having the same capacity.

The inventor is Mr. Charles N. Lewis, of Seneca Falls, N. Y., and of him any further information can be had. His patent bears date Jan. 1, 1856.

IMPROVED DOUBLE ACTING FORCE PUMP.



IMPROVED APPLE PARING AND SLICING MACHINE.



Machine for Paring and Slicing Apples.

The accompanying engraving represents an ingenius machine for paring and slicing apples and other fruit, a patent for the parer having been granted to S. N. Maxam, April 10th, 1855, and measures have been taken to secure a patent for the slicer, that being of recent invention. The machine is small, nearly all its parts being of cast-iron, the whole weighing only 2 pounds 10 ounces.

The contrivance is secured to the table by means of the clamp, A, and to this is attached the standard, B, by means of the strong joint at B', which permits the careening of the machine both right and left. E is the driving wheel, motion being given by means of the crank to all the parts. Upon the face of the driving wheel, E, is an inclined scroll, F, upon which one end of the rack bar, G, slides; this rack connects with, and gives motion to, the loop gear, H, which supports and guides the spring rod, I, upon which is affixed the paring knife, J.

The machine being careened, as shown in the cut, an apple is placed upon the fork, K, when by rotation of the crank the driving wheel, E, gives motion to the pinion, E', and thence to the fork and apple, while the scroll, F, acting through the rack bar, G, upon the loop gear, H, the paring knife, J, is thereby passed, during the rotation of the apple, from its base around to its outer end, and effectually *pares* the apple, when—the outer circuit of the scroll, F, having passed the end of the rack bar, G,—the coiled spring attached to the other or lower end of the rack bar, contracts, and returns the rack bar, loop gear, spring rod, and paring knife to their original positions, in readiness to repeat the operation of paring.

Without removing the apple from the fork the machine is now careened in an opposite direction, when the pin, L, which secures the loop gear, H, within its socket, comes in contact with the tripping post, M, causing the partial revolution of the loop gear, and thereby withdrawing the end of the rack bar, G, from the scroll, F, thus permitting the backward rotation of the crank and driving wheel, together with the fork and apple. The slicing arm, N, which is hinged to the standard, B, and sustains the slicing knife, O, is now swung by the left hand and pressed lightly against the apple, which is thereby cut into one continuous slice or ribbon, leaving only the core, in cylindrical form upon the fork.

The careening of the machine perfectly accomplishes the separation of the slices from the parings, while the parabolic curvature of the slicing knife produces such a formation of slices that they do not pack closely together while drying, and yet are not in the least objectionable for immediate cooking.

This is a novel contrivance; that it works well we know from actual experiment. More information may be obtained, by letter, of the proprietors, Maxam & Smith, Shelburne Falls, Mass.

Saltpeter for Butter and Meat.

What office does saltpeter perform in the preservation of butter and meat that is not as well performed by the use of common salt alone? This is an important question, because, if saltpeter exerts no special preservative influence not to be found in common salt then it should not be used in butter nor in the brine of meat, because it has a bitter taste, and must impart more or less of it to butter, especially. We have been assured by those who have packed butter with and without saltpeter, that it is much better not to use it for this purpose. The best plan of salting butter is to use the purest salt only; heat it on the fire before using it, to drive off all the moisture, and apply it warm, when working the butter.

An antedeluvian duck is stated by a Paris paper to have recently been dug out alive in France while cutting a railroad tunnel. The Paris editors are strange ducks, to give currency to such stories.

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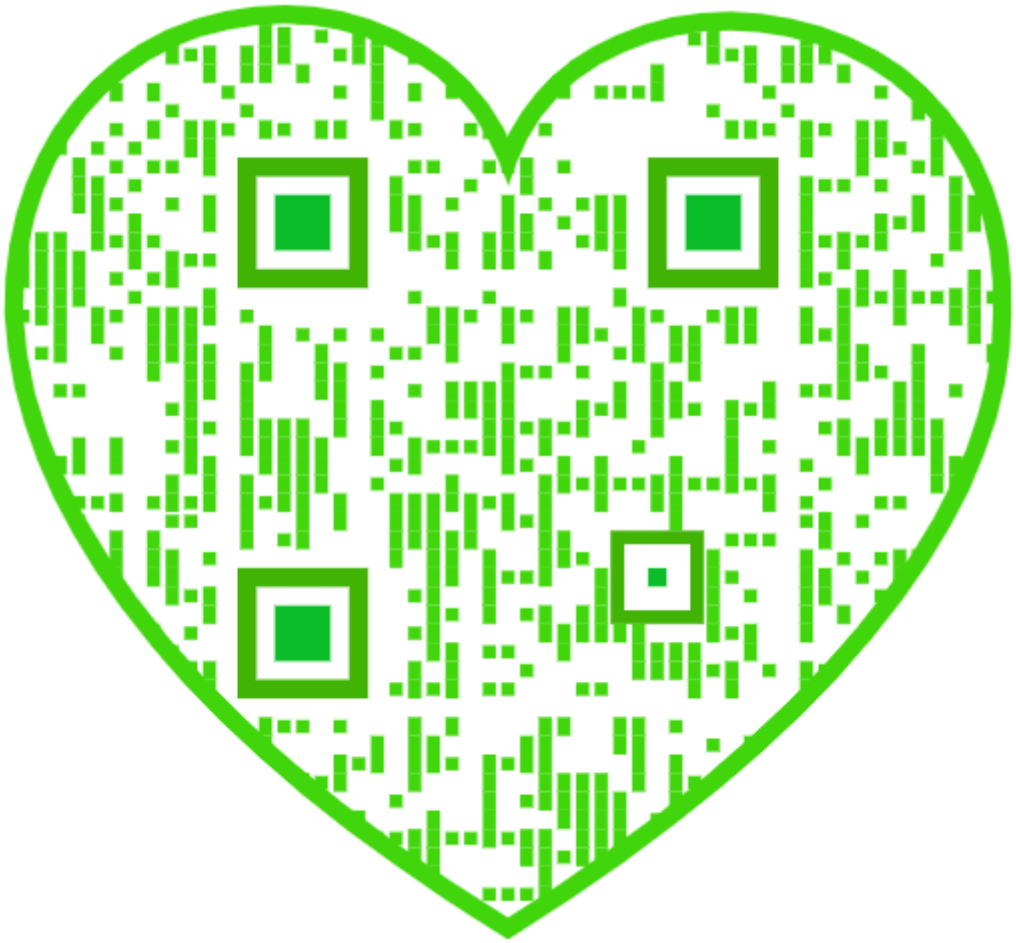

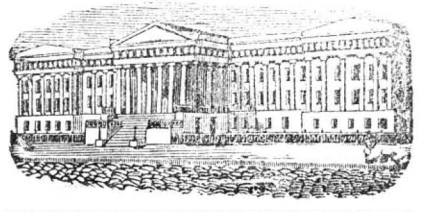

[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING MARCH 11, 1856.

R. R. Car Brakes—Vincent Barness of Washington, D. C.: I claim attaching the frame or brake, C, to the truck, B, by the parallel levers, a, so as to form a self-acting reversible brake, operating as set forth.

Hot Blast Furnace—La Fayette Blair, of Painesville, O.: I claim the tunnels, b, diaphragms, h i j k l, and m, division plate, d, and casing, e, arranged and combined as described and for the purpose specified.

Valves for Lock Gates—Wm. Butler, of Little Falls, N. Y.. I claim the combination of the flange valve, A, and slide valve, B, when said flange valve, A, is hinged to the lower end of the valve, B, and made to operate in the manner and for the purposes described.

Ore Washer—Wm. L. Carter, of Marietta, Pa.: I am aware that a cylindrical vessel with a forced current of water against the material passing through it, has been used used for washing ores. This I do not claim.

But I claim a conical vessel provided with shovels and pins or projections whose shaft is horizontal, and lower side inclined, so that water introduced at one end shall have a natural flow to the other end, and meet the ores as they pass in an opposite direction, to wash them, substantially in the manner and for the purpose set forth.

India Rubber Belting or Banding—J. H. Cheever, of Boston, Mass.: I do not claim the mode of preparing the rubber, or of compounding or vulcanizing the fabric, nor the machinery, and therefore, these are all well known to the manufacturer of rubber goods.

Nor do I claim the compounding of fibers of cotton or flax with india rubber, as this has been done for the purpose of packing steam joints, and for other similar purposes; but it has never been done in the manner described; nor has it ever before been used to constitute the fabric known in commerce, by belting or banding.

Nor do I claim by this patent the new process of making fibrous rubber goods in such a form that the fibers are arranged crossing each other in the manner described, for enabling the fabric to resist tension in all directions, and giving it flexibility without elasticity, as I intend to make these the subject of a separate application for Letters Patent.

But I claim the improvement in the manufacture of rubber belting or banding, which consists in compounding fibers of cotton or flax with india rubber, substantially in the manner and by the processes described.

Bench Clamp—C. W. Clapp of Wappingers Falls, N. Y.: I claim the hook, D, attached to the shank, E, which is formed of two parts, a b, having beveled ends and connected as shown, the shank being fitted in the groove, B, in the bench, and used in connection with the stationary hook, C, substantially as shown for the purpose specified.

Washing Machines—E. B. Clement and S. G. Willie of Barnet, Vt.: We claim the saw teeth shaped rubbers, D D, made and operating substantially as described.

Heating Buildings by Steam—Charles Davenport, of Watertown, Mass.: I claim so connecting the float with the dampers of both the draft and smoke flues by means of the chains, M and L, or their equivalents, that the pressure of the steam within the boiler may be graduated to the temperature of the atmosphere, and the degree of heat required within the building, as set forth.

Second, so connecting the float which actuates the damper of the draft and smoke flues with the cock, X, which admits water from the supply cistern to the boiler, by means of the lever or its equivalent, that while the float is left free to rise to any required distance, it will open the cock whenever the water falls below its level, as described.

Sewing Machines—H. R. David, of New York City: I claim the method described and shown of leading the thread to avoid wear or derangement thereto, by combining with the slide, D, in the patent of David M. Smith, of 16th of April, 1850, and on which this is an improvement, the needle, F, constructed with the two eyes and the groove to act in the manner and for the purposes specified.

Preparing Hemp and Flax—Nancy Davy, executrix of Edward Davy, of Crediton, Eng.: I claim the reciprocating plate or plates, f, in combination with holding or retaining rollers, c, for effecting the separation of the fibers of flax and hemp, substantially as described and combined therewith.

I also claim the combination of the hackle bar, operated as described, with the rollers and reciprocating breakers or plates.

Preventing Horses in Carriages from Falling—R. D. Dwyer of Richmond, Va.: I claim the application of a suitable projecting frame, attached to the most convenient part of the carriage, or to the carriage or front axle, projecting over and between the horse or horses sufficiently far and at a suitable distance above, so that straps, chains, or other suitable fastenings can be attached to the harness round the body of the horse and to the collar, as shown, for the purpose described.

Parallel Ruler—R. Eickemeyer, of Yonkers, N. Y.. I claim providing the ruler with a movable foot piece, c, and suitable stops, to operate substantially as and for the purpose specified.

Tallow for Making Candles—Francisco Garcin, of Philadelphia, Pa.: I claim the method described, of bleaching and purifying fat or tallow for the purpose of making candles, the same consisting in the use of reduced nitric and sulphuric acids, alcohol, creta, gallica, slacked lime, camphor, borax, egg shells, and oil of lemon, in the proportions and order set forth.

Spark Conductors for Locomotive Trains—P. C. Guion, of Cincinnati, O.: I do not confine myself to any exact form or dimensions; I do not claim the smoke pipe or funnel, or frame, or the yoke or the springs—neither of them by themselves.

But I claim the yoke, Y, with the springs, S S, and the frame, F, as arranged so that the pipe shall have free space and liberty to play by the yielding to the springs to accommodate the rocking motion of the cars, or the up-and down motion without cramping or injuring the pipe, and also to give room for the back-and-forward motion allowed by the car coupling, for the purpose and in the manner set forth.

Tanning—Raselous Gould, of Whitewater, Wis.: I do not claim the use of catechu in the process of tanning, for its use has long been known. I do not claim to have discovered any new property of catechu or niter, or of alum, in relation to their employment in tanning operations.

But I claim that in order to insure the proper exercise of the properties of these substances in tanning, they must be used in a certain manner differing from the mode in which they have hitherto been known to be used. I claim that in order to use these substances effectively for tanning they must be employed substantially according to the processes set forth. And I claim that when these three substances, or their chemical equivalents have been employed together, they have and must fail, as they are to some extent incompatible when so used.

But I claim the use in the process of the tanning of hides and skins for the making of leather of the two solutions described, used, and applied, each separately or at different times and in the order following, viz.: first, by using a combined solution of catechu or any other material its equivalent, as containing the tannic properties, and alum, substantially in the mode of application described, or any mode equivalent thereto.

Straining Mulley Saws—Theodore Sharp, of North Greenbush, N. Y.: I claim straining the saw by attaching its ends to a pivoted elastic bar, E', substantially as shown and described.

Carriage Tops—Henry Hayes, of Quincy Ill.: I claim the plate or circle, c, having the slat iron of the front bow projecting from it, working on a pinion on the standard, h, in connection with a spring latch or pawl, fitting into notches in the plate by means of which the top of the carriage is sustained in an elevated or half elevated position substantially as described.

Ironing Hats—S. A. Kinsman and Samuel Field, of Barre, Mass.: We do not claim any peculiar form of hat holder, nor any spring movement to a side flat, nor a fan to regulate the downward movement of the hat block, nor any arrangement of toggles to operate the crown flat, for all of these we are aware are embraced in a patent granted to Dexter Dennis, July 4, 1854.

We claim arranging the cam, 14, so that when operated by the gear, 15 and 17, substantially as described, it will control the vertical movement of the hat block through levers, 21 and N, in combination with the lever, L, arranged substantially as described, to control the lateral movement of the hat block, and thus secure the adequate pressure on all parts of the hat at one time.

Harvester Cutter—I. S. Love, of Beloit, Wis.: I do not claim the cutting blades in their usual form; nor do I claim the other parts, as they have hitherto been used.

Neither do I claim the tooth, X, which may be made either in one piece or more, when used without the tooth, Y. But I claim the use of the clearing tooth, Y, in connection with the cutting tooth, X, as set forth, provided the cutters be distinct, and the spaces between them continue back to the rear of the cutter bar.

I do not limit myself to the exact form or proportions of either, for it is evident that either of them might be slightly varied, without materially altering the effect.

Spirit Blow Pipe—H. N. Macomber, of Lynn, Mass I claim combining with the vapor jet of a spirit blow pipe, an air jet, f, and a mouth tube, g, so applied to said vapor jet, that air may be blown from the lungs of a person directly into the inflamed current of said vapor jet in order to control, elongate or reduce said current and increase its heating powers, as specified.

I also claim arranging the air jet concentrically within the vapor jet, in order that the effluent current of air may pass into a hollow tube or stream of vapor and flame.

I also claim combining with each main jet tube a lighting vapor jet tube arranged so as to operate therewith, as specified.

Mowing Machines—J. J. Mann, of Westville, Ind.: I claim the constructions of the reel frame, I J K K, the same being braced by the rod, L, and the suspension of the reel, F, at the outer extremity of the shaft, G, by the pendent, L.

Bending Wood—J. C. Morris, of Cincinnati, Ohio: I claim the clamps, 6, 6, to prevent end expansion and the levers, 7. 7, working on fixed fulcrums when in operation, all substantially as and for the purpose set forth.

Revolving Fire Arms—Frederick Newbury, of Albany, N. Y.: I claim the following apparatus, substantially as set forth, viz., the combination of the wheel gearing and pawl, with the trigger, by which means the block, C, is revolved; the wheel gearing itself is not claimed.

The priming cap magazine, in combidation with the trigger, to permit the capping of the cone by the trigger.

The spring guard plate to prevent the fire from the upper chamber extending to the lower.

The combination of the picker attached to the hammer with the apparatus operated by the thumb in the act of cocking the hammer, substantially as set forth.

Carriage Hubs—Henry Nycum, of Uniontown, Pa.: I do not claim a hub, the central portion of which is provided with mortises or recesses for the reception of the spokes, as I deem such a hub impracticable from its very nature, as it limits the number of spokes in the hub, or wheel to less than are actually necessary.

Nor do I claim a hub composed of concentric rings of alternate iron and rubber with the spokes abutting against the outer ring, which would so enlarge the hub as to make it useless for my purpose.

But I claim a hub composed of a back and front section, A B, and having a thin metallic tube or ring, E, independent of each centrally placed between them against which the inner ends of the spokes abut when said sections are so made that, in removing the back one, A, the pipe or box of the hub shall also be removed or removable with it to facilitate the properly introducing of a new spoke, substantially as described.

Steam Boilers—Leonard Phleger, of Tamaqua, Pa.: —I claim, first, the arrangement of the arched water space, a b c, so that the boiler may be suspended near to the track, in the manner and for the purposes substantially as described.

Second, the arrangement of the arched water space, a b c, the water space, N M, and the water tube, L L', in combination, so that the flame and heat will be never berated in the manner and for the purpose substantially as described.

Harvesters—B. T. Rooney, of Philadelphia Pa.: I do not claim, exclusively, double cutters operating simultaneously, nor the use of vibrating cutters nor belts for carrying off the grain to one side of the machine.

But I claim the gear frame with its lugs, u u, in combination with the movable or cutter frame, its bar, W, lugs, t t, and beveled projections, V V, the whole being arranged and constructed, substantially in the manner, and for the purposes set forth.

Straw Cutters—E. P. Russell, of Manlius, N. Y.: I claim the wheel, C, with the rim and cams, O', on the inside of the rim, in combination with friction rollers, h, for raising the box, with the knife, b, attached, and causing it to pass the edge of the stationary knife, which is placed in such a position as to give them the shear cut, as set forth.

Second, I claim setting the box at any angle of about 45 degrees, and hung on a hinge or pivot with a joint or hinge, d', in the bottom, for feeding the straw to the knives, and or allowing the knife, b, to cut, as set forth.

Lime Kilns—Job Sands, of Sand's Mills, N.Y.: I claim having the fire chamber, B', of the kiln so constructed that the bottom will be but a short distance below the door, C, no grate bars being employed, and having an aperture, a, made through the door, so that the air that feeds the fire will act horizontally upon it and nearly in line with the opening, a', for the purpose specified.

Puddling Iron—Richard Savary, of Steubenville, O. I claim the arrangement of the cupola, and puddling furnaces, constructed and operating as set forth.

Heating or Cooking by Gas—W. F. Shaw, of Boston, Mass.: I am aware that perforated cones have been used for admitting atmospheric air to ordinnry fuel for promoting combustion; this I do not claim.

But I claim the application of a cone or dome formed of wire gauze or pierced metal to an ordinary wire gauze gas burner, for burning mixed gases and air, in combination with an outer cylinder of wire gauze, or pierced metal, for the supply of atmospheric air, divided into jets, substantially as described.

Box for Axles—A. E. Smith, of Bronxville, N. Y.: I am aware that the flues have been cast with grooves in them, and that one of these grooves has been made to connect by a tube along the outside of the box, with the face of the hub, so that oil might thereby be poured in, so as to avoid the necessity of taking the wheel off. These grooves cannot be said to act as reservoirs strictly, and they also have taken away too much of the bearing surface, so that the axle wears into the box along the sides of the groove.

I do not claim making slots in the box in the line of the axle or reservoirs communicating with the axle by holes or funnel-shaped apertures,

But I claim the combination of two or more longitudinal narrow slots cut in the direction parallel to the axis of the box with enlarged longitudinal cavities, substantially as described and for the purpose specified.

Mortising and Boring Machine—G. N. Stearns, of Syracuse, N. Y.: I do not claim a movement of the carriage exclusively of the means by which it is done.

I claim, first, an adjustable cam, in combination with the levers, F K, T, spring, M, pawl, L, pinions, N P, and rack, R, as set forth.

Second, I claim the use of its spring or its equivalent to move the clutch which gives the return motion to the auger.

Soles of Boots and Shoes—William Wells and Mellen Bray, of Turner, Me.: We claim operating the knife, R, which is attached to the bar, S, by means of the lever, n rod, m, with plate, l, attached, on which plate the bar, S, rests the ledge, T, on the heel of the stock, F, substantially as shown, for the purpose specified.

I further claim the knives, Q R r, when attached to or connected with an elastic platform, I, substantially as shown, for the purpose specified.

Making Extracts—Abraham Steers, of Medina, N. Y.: I claim the described displacing apparatus in connection with the application thereto of heating and cooling agents, substantially as set forth, viz., the said apparatus being composed of the percolator, K, and the receiver, M, separated from each other by means of a perforated diaphragm, or its equivalent, the said percolator having its upper end closed by a metallic cover, supplied with an outwardly opening valve at the same time that the top of said percolator is connected directly with the said evaporating receiver by means of a pipe supplied with a valve or a stop cock, by which arrangement the contents of said percolator can be operated upon, first, by steam generated in the evaporating receiver, and then by the percolation of the menstruum after it has been evaporated and condensed again, substantially as set forth.

Reducing the Friction of Slide Valves of Steam Engines—R. L. Stevens, of Hoboken, N. J.: I am aware that devices have been contrived with a view to effect the reduction of the friction of the slide valves of steam engines by attempting to counteract or balance the pressure of the steam on the valve. But I am not aware that any plan or combination, similar to that which I have described has been used or described before.

I claim the box or balance block, B, constructed substantially as described, in combination with an ordinary slide valve altered as described, said balance block having around the edges of its upper face ledges, L L, which project upward, and are made to fit, around the whole upper face, into a recess, such as described, in the follower, D, and formed by double ledges projecting down from D, and enclosing L, which recess has an india rubber packing in its bottom, against which the said ledges, L, are made to pack steam tight, together with another india rubber joint at the bottom of another similar recess formed by the ledges, L L, and a part of the bonnet, C, into which latter recess one of the ledges of the follower, D, fits tight in the same manner as the ledges, L, fit in the recess.

Revolving Fire Arms—William Mt. Storm, of New York City: First, I claim extending the casque forward as far as the face of the cylinder, and surrounding it, to form a receptacle for it while loading, in combination with a hinged apron piece, fig. 5.

Second, I claim, in combination with the so arranged barrel and casque, and for locking them together, the solid self-acting locking spring, (as distinguished from a locking lever, having by necessity a hinge to wear loose and c,) said spring being arranged to resist the discharge by its direct tensible strength, as shown.

Third, I claim, in combination with the casque or cylinder receptacle the safety screw, Q, projecting into the recess between the shoulders, r r (or as equivalent, the screw on the cylinder and the shoulders on the casque,) to prevent the cylinder from getting dropped, while loading or capping in action, as explained.

Fourth, I claim the central revolving shaft with the button head, i, forward of the sleeve, G, and both projecting within the central cavity of the cylinder beyond the line of its rear and the fire of the cap, in combination with a revolving wheel located within the stock enclosed from the fire and smoke, all substantially as explained and shown.

Fifth, I claim, in combination with the dog, having an inclined plane or projection at its forward end to meet the purpose of such combination, an adjustable tripping screw, hereby despite of wear, and c, the detachment of the dog from the rear may be effected sooner or later in accordance with the needed distance of revolution of the many chambered cylinder.

Sixth, I claim extending the rear of said dog downward from where it connects to the heel of the hammer and connecting the pawl directly thereto, by which means the pull on the dog by the trigger, directly operates the pawl to push around the cylinder.

Seventh, I claim extending the pawl beyond where it is connected to the downward extension or heel of the dog and connecting the main spring to the part so extended, by which means the pull of the dog on the pawl distends the main spring, while the latter being distended presses the point of the pawl more firmly into the revolving holes or indentations in the face of the revolving wheel, preventing any slip while the revolving cylinder in all points, rendering the use of a pawl spring unnecessary.

Eighth, I claim pivoting the usually fixed end of the main spring, in the manner explained, so that while stationary it shall not be fixed, but free to compensate for its own vibration, and that of the rear of the pawl, thus rendering the use of the usual vibrating or connecting link between the main spring and the rest of the lock unnecessary despite of the immediate connection of the main spring to said pawl.

Ninth, I claim the locking notches in the revolving wheel, c, or its equivalent, in combination with the crest on the dog for the purpose of securing the stoppage and locking fast of the cylinder at the proper position for discharge, as set forth.

Tenth, I claim in combination with the forward shoulder or detent on the head or rear of the trigger, the screw projection or detent on the rear of the head or rear of said trigger to the end, that after said forward detent or hook ceases to act by the dog being thrown off to lock the revolving wheel, C, and thereby the cylinder in place, the hammer shall not immediately fall but be retained on cock, to give opportunity for deliberate aim, as explained, said rear projection or detent catching at this point on the downward prolongation of the heel of the hammer for this purpose, the whole being arranged and acting in conjunction, as explained.

Cutting Irregular Forms—H. D. Stover and Jas. W. Bicknell, of Boston, Mass.: We claim combining the guide, f, with the bearings, e, substantially as and for the purpose set forth, and also combining the cutter head with this guide, in such a manner that they shall move up and down together, substantially as specified.

We also claim the combination of the cutter head, arbor, and pivoted bearing, e, so as to allow the cutting angle of the knives to be varied in relation to the table, substantially as set forth, and also combining therewith the mechanism substantially as described for varying that angle gradually in the cutting process.

Harvester Cutters—Pliny Thayer, of Lansingburg, N. Y.: I claim, in combination with the plates, e, lying loosely on the fingers or guards, but kept from moving by the projections, ff, on the plates and the open counter sinks on the guards, the cutters, d, which are vibrated past those, e, and held to them by the guides and springs, L M, substantially as described.

Plane Stock—John B. Thomas, of Cincinnati, O.: I claim the glass face, 3, combined with the case of ferrule 1, or its equivalent, all substantially as and for the purpose set forth.

Wrench—Erastus Tracy, of Troy, N. Y.: I am aware an auxiliary jaw or griper applied to or inserted within either the movable or stationary jaw of a hand or screw wrench has been used. This I do not claim, it being too expensive in construction and inefficient in its operation to come into general use.

But I claim making the movable jaw in two sections pivoted together, one of which sections embraces the shank and the other forms the clutch by which the whole jaw is held to the shank, and both sections made united, and operating in the manner and for the purposes set forth.

Fountain Pen—A. F. & C. M. H. Warren, of Brooklyn, N. Y.: We do not claim the plate, G, separately, for they have been previously used, although applied to the pin in a way different to that shown. Neither do we claim a piston for filling the fountain with ink, for they have been also used for the same purpose.

But we claim, first, having the piston, D, and rod C, arranged as shown, or in an equivalent way, so that the piston may be detached from the rod when the tube or fountain is filled with ink, for the purpose specified.

Second, we claim attaching the pen, E, directly to the lower end of the tube, A, by the band, F, and conducting the ink from the tube, A, to the back or convex side of the pen by the wire, g, which is attached to the pen and passes through the apertures, e d, as described.

Third, we claim the plate, G, attached to the back or convex side of the pen, E, in combination with the wire, g, arranged as described, for the purpose of ensuring a regular and even supply of ink to the pen.

Faucet—Moses Woodbury, of Boston, Mass.: I claim the combination of the handle, constructed as specified, with the stem and the spring, when the latter is placed behind the valve, substantially as set forth.

Umbrella Ribs—Charles C. Reed, (assignor to himself, Wm. S. Reinert, and Jacob Schnell,) of Philadelphia, Pa.; I claim the manufacture of umbrella ribs by grooving a cheap material such as hickory, bamboo, or rattan, and securing within the groove a strip of whalebone, substantially in the manner set forth.

Dovetailing Machine—Edwin Wight, of Philadelphia, Pa.: I do not claim the exclusive use of revolving and traversing cutters, as they are employed in a variety of machines.

But I claim the cutting of dovetails of exactly similar size and form on the edges of a number of boards at one operation, by placing the said boards one upon the other, arranging them in the manner set forth, or any other equivalent to the same, and submitting them to the action of revolving and traversing cutters.

Grain and Grass Harvesters—Abner Whiteley' of Springfield, O.; I claim, first, the naarow divider, as described, and for the purposes set forth.

Second, I claim making the divider with that portion forming the under or upper side of the slot removed as the case may be, as set forth.

Third, I claim terminating the shoe, B, at or near the point of the blade which cuts against it, to prevent it carrying grass.

Fourth, I claim extending of the tops of the guards over the edges of the lower portions as described, for the purpose set forth.

Fifth, I claim the double cap, 6 6, as described, i. e., the caps of two guards in one piece, having one shank for attaching it to the finger-piece. But I do not claim one cap having two shanks for attachment.

Sixth, I claim attaching the shanks of the guard caps to the finger-piece as described, for the purpose of preventing straws or blades being carried beyond them to cause clogging.

Seventh, I claim terminating the points of the finger or fingers at or near the points of the blades, for the purposes set forth.

Eighth, I claim making one side and also one edge of the cutter bar, or either of them, a rasp or rough surface as described and as set forth.

Leather Splitting Machines—Elisha Pratt, (assignor to E. Pratt and H. P. Upton, assignors to E. Pratt and Thos. P. Pingree) of Salem, Mass.: I claim so hanging and arranging the lower roll as described, by means of the levers, I, connecting rods, L, and plate, d, or their equivalents, that it may be depressed when required, for the purpose of relieving and adjusting the hide, as set forth.

Securing Thills to Axles—Matthias Soverel, of Orange, N. J.: I claim the combination of the spiral spring, F, and the catch or nut, E E, and the eye of the bolt, H, fig. 2, and the spiral chamber and slots, c, fig. 1, substantially as described.

Boot and Shoe Soles—Lorenzo Stratton, of Feltonville, Mass., assignor to himself and Luther Hill, of Stoneham, Mass.: I claim the described improvement in the manufacture of shoe soles, viz., striking them up in nests be tween formers and counter formers, B E F, substantially in the manner set forth.

Sewing Machines—Wm. C. Watson, (assignor to Ira W. Gregory,) of New York City: Firstly, I claim the tongue or spring, r, in combination with the needle for insuring the formation of loops on one side only, as described.

Secondly, I claim the gripper for seizing the thread and holding it until the needle has entered the cloth, thus securing the last stitch against slacking up, as described, the whole being constructed and operating substantially as set forth.

Boxing Carriage Wheels—Chas. Schmidt, of Union, Me.: I claim the method of boxing carriage wheels as before substantially described.

RE-ISSUES.

Grain and Grass Harvesters—Abner Whiteley, of Springfield, O.: I claim, first, changing the angle of the fingers and cutters of reaping and mowing machines while the machine is in motion and the finger-piece resting on the ground as described, and for the purposes set forth.

Second, I do not here claim oscillating the finger-piece about an axis within itself irrespective of the relations between the main frame and the master wheel shaft.

But I claim so constructing the machine (as described or otherwise, the result being substantially the same) that the driver, while the team is in motion, and the boxes of the master wheel shaft being rigidly connected with the main frame to change the angle of the fingers and cutters without moving the finger-piece from the ground.

Splitting Match Splints—Benona Howard, of New York City, assignee of Lewis Smith, late of Brandon, Vt.: First, I claim, the use of the arrangement of the four cutters, arranged and operating substantially as set forth, in combination with the cutter frame or box for the purposes described, and also the use of the cutters and cutter frame, arranged and operating as described, in combination with an adjustable cap or clearer plate, for the purpose of holding the blocks of wood while under the action of the cutters, substantially as described.

Second, I also claim the jointed levers or their equivalents with or without springs at their backs, for the purposes set forth, and their combination with their cutters and crank motion or their equivalent device for working or operating a crimper for crimping or matting the surface of blocks of wood.

Third, I also claim the use of the crimping or compressing levers or their equivalents, in combination with the bed board, M, for crimping and matting the lower surface of the blocks, substantially as described.

Fourth, I also claim the use of the shafts, R, and ratchet feed wheels or equivalents, for the purpose of feeding the block through the machine, in combination with the adjustable cap or clearer plate and bed board, when used for the purpose of spliting blocks of wood.

ADDITIONAL IMPROVEMENT.

Excavating Machines—J. J. Savage, of New York City: I claim the adjustable brace, A', or its mechanical equivalent, in combination with the oscillating connecting arms, H H, the combination being substantially in the manner and for the purposes set forth.

I claim the adjusting guide, B', or its mechanical equivalent, constructed and operating substantially in the manner and for the purposes described.

I claim the tipping scoop, X, having a stationary back firmly bolted and braced to the scoop staff, which back forms a rest or shoulder for giving firm support to the scoop in its excavating operation, the scoop being constructed and affixed to the staff, and operating in the manner and for the purposes substantially as specified.

A Strange Accident by Burning on a Railroad

We learn from the Richmond (Va.) *Dispatch*, of the 12th inst., the particulars of a terrible accident on the Seaboard and Roanoke Railroad, which took place near Margarettsville, N. C. A correspondent of the *Dispatch* says :—

"The accident occurred about 16 miles south of this, near the station known as Margarettsville. The trestle-work at that place is some thirty feet high, and had long been regarded as very insecure; in fact, the engineer had just "shut off" steam, intending to cross at a slow rate of speed, when the engine left the track, and was followed by the whole train, consisting of an express car, a baggage and mail car, and two passenger cars. Before any of those on the train had time either to reflect or act, it was found that the cars were on fire, and, horrible to relate, no less than four persons were literally roasted in the flames. Every car was also entirely consumed. Even the wood-work on the locomotive and the entire mail and express freight was so thoroughly destroyed that nothing remained but a pile of ashes, with here and there a brass lock, to mark the scene of devastation."

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(For the Scientific American.)

Sisal Hemp.

[Concluded from page 211.]

The leaves of the *Maguey* vary in length from two to six feet, and are from three to five inches wide; they are frequently three and four inches thick at the butt. The fibers lay embedded in a soft gummy pulp the whole length of the leaf, they being straight and parallel. The entire pulp of the leaf, epidermis and all, when dry, after the gum is washed out, is nothing more than a powder. This is a most important fact in connection with cleaning the fiber, and must be borne in mind in contriving any machine for the purpose. In Yucatan they get out this hemp by the simple and primitive manner of beating the leaf on a block with a club or mallet, and afterwards scraping it on a bench or a smooth log or pole, with one end on the ground and the other breast high. They use a narrow piece of board with a triangular notch in the end, which is brought to an edge, and held nearly perpendicular when used. The leaf is laid on the pole, held with one hand, and scraped with the other. This would seem a very awkward way, more so even than when a bench is used, when the leaf is held by the breast, and is scraped something after the manner that leather is curried, the operator having either a long piece of triangular hard wood or a piece of thin iron with a handle at each end, and using both hands to scrape the fibers; either plan is tedious and inefficient. In order to get rid of the gum more readily, they generally soak the beaten leaves either in water or in mud till they ferment; but from the nature of the gum—which I think has both starch and azote in it—even a small amount of fermentation both stain and weaken the fibers, although it materially facilitates the cleaning of them. Such is the difference of the value of these fibers got out by the two processes of fermenting the leaves before scraping and the one of beating and scraping the leaves at once, before fermentation takes place, that I see in the London market that fibers out of an Agave like this Sisal hemp, are worth but £12 per tun when they have been soaked in water or mud; yet the same fibers are worth £50 per tun when got out before fermenting by the aid of fair water alone. It would seem that this difference in the price of the fiber will warrant a good deal of labor and expensive machinery to get out the article in the better state.

I am firm in the belief that the best plan to clean this hemp will be found to be, to pass the leaves through a series of rollers made of iron and set in an iron frame so that they would be entirely unyielding. The first set, perhaps, it would be well to have corrugated, the better to crush the leaf; but the rest, I think, should not only be turned as true as tools could do it, but should be polished and kept perfectly clean while in use, so that nothing but the fiber and pulp should interpose between them. These rollers should be from 14 to 18 inches in diameter, and should be driven by a motor of from 10 to 20-horse power, according to the number of rollers it was found necessary to perform the work well, and according to the amount of work required to be done; that is, if 4 or 6 rollers were found insufficient to clean the fiber well, let the double of those numbers be used. The leaves could be fed into the first set, and while passing from set to set water could be thrown on to them between the rollers, in jets or otherwise, in sufficient quantity to wash out the gum Thus treated, if it be beaten after being dried, I think it would be ready to bale for market without scraping or combing. But even in a machine such as is here indicated, an invention is required, to have the fibers fed forward with the least possible manual labor, likewise to have them kept parallel and from tangling, yet so spread that but a single layer of fibers should pass through one or two of the last sets of rollers at a time.

By any system of crushing the leaves and afterwards scraping or combing the fibers clean that I can conceive of, in addition to the increase of labor and the number of times that the article would have to be handled, the process must break and render nearly useless from one-eighth to one-quarter of the fibers, whereas, by the plan I have hinted at, if the fibers are kept from tangling, the loss would be nothing, and they would be in a perfect state to spin into rope yarns, &c., without combing at all. Nor can I think this will be difficult, for, as before stated, the fibers are continuous and parallel in the pulp of the leaf.

There have been some attempts here to improve the process of getting out this hemp, by first crushing in a simple pair of rollers, and afterwards steeping in alkaline pickle and combing, which is, undoubtedly, an improvement over the primitive Yucatan method; yet this plan destroys the soft silky gloss that this hemp possesses when got out from the fresh leaves by the aid of fair water alone. From the juice of the leaf being acid, perhaps the alkaline pickle does not materially injure the strength of the fiber, yet it does certainly destroy the gloss; besides, it increases the expense without benefit.

To close this part of the subject I will add, that where the business is pursued on a large scale, the expense of the machinery, or the amount of motive power required, should be, and really is, a subordinate matter to the amount of manual labor, which should be reduced to the least possible quantity. For those who carry on the business on a small scale, a less expensive plan, even if less perfect, would be desirable.

If any person should wish to test any machine that they may contrive, who lives near the large cities of the seaboard, I will with pleasure send by steamer when opportunity offers, a cart-load, or such an amount, of leaves for the purpose. The California steamers from St. John frequently stop here, and although they may not wish to take it as freight, I dare say they would take it as an accommodation if the Agent was consulted. I speak of steamers, because the leaves would wilt too much in the time it would take sailing vessels to carry them to any considerable distance; after they arrive they should be kept cool and damp, that they may remain as green and fresh as possible.

Any one wishing leaves for such a purpose, by informing me by letter, directed to Key West, Fla., what steamer will carry them, they shall be placed on board free of expense; likewise any further information that I can give will be cheerfully rendered, by application to me by mail. W. C. Dennis.

P. S. There is an article in the agricultural part of the Patent Office Report for 1854 from an East India paper on the subject of cleaning the fibers of such plants as Sisal hemp, which inventors should consult.

Curing Meats.

Messrs. Editors—On page 90, this volume Scientific American, a method of preparing hams of pork and beef is described. My teacher—"experience"—has taught me a different mode, or rather, the time of applying the salt. In Ireland, where the air is said to be very pure, and the temperature low, meat is suffered to cool until the life heat is all gone, and the meat stiff. When the muscle of killed flesh relaxes its rigidity, it is a sign that decomposition has taken place. Animal substances undergo various fermentations just like vegetable substances; the grand object of saving meat to perfection, is the preventing it passing from saccharine fermentation. On this continent I have cured meat in the Canadas—East and West,—New Brunswick; in the Eastern, Middle, and Western States, and in most of the U. S. Territories. I have also cured fish in various climates in *three* zones, in all seasons, and have "carried the bell" from both fishers and hunters. Well, your mode of curing beef hams is good. I have eaten beef killed in Liverpool in May, and in Montreal (Canada,) in August, rolled up and dusted with red pepper, covered with canvas, and then corded. I have killed venison in June, in Iowa, cut out the bones as quick as possible, heated up salt, and applied sufficient to season the meat, then submitted it to a press to squeeze out the brine and fluids, and thus have cured it. I have treated every kind of meat eaten by the Western farmer and hunter in this manner, with perfect success. In thirty years I have not lost a pound of meat by its being spoiled or tainted. I have the utmost aversion to tainted meat. Butchers frequently allow meat to become tainted—partly decomposed—then they use a great deal of salt and niter to saturate it and prevent further decomposition. Meat so treated becomes perfectly indigestible.

A few hours is sufficient time to salt meat, and three hours are enough for salting fish. The salt must be deprived of all its water, excepting that of crystalization. It is a very good plan to surround salted meat with charcoal.

The following is my rule for curing meat. As soon as the animal is deprived of life, cut it into suitable pieces, extract all the bones, or cut open the joints, and wipe all the watery matter found in the joints; put on the salt as hot as can be borne by hand, rubbing it into the pores; then put it into a press to extract the brine, then change the position every six hours, applying a little salt until it is perfectly salted. It may be afterwards dried for transportation or kept for use, or, instead of drying, it may be packed in charcoal. "Nothing beats trying." J. A. H.

The Rays of the Sun.

Messrs. Editors—According to the statement of "Perdex," on page 162, this volume of the Scientific American, it requires more pressure of atmosphere than seven pounds to the square inch to separate caloric from the rays of the sun.

It is supposed by many philosophers of the present age, that the moon has no atmosphere. It is well known that the light from the moon is the reflection of the rays of the sun. From experiments made many years since, I found that however highly the light from the moon might be concentrated, it did not contain sufficient caloric to affect the most sensitive thermometer. The colorific and decomposing rays were reflected, but no caloric.

I must conclude, therefore, that the moon has an atmosphere of sufficient density to separate caloric from the rays of the sun.

When I mention the rays of the sun, I refer to the mass of light we receive from that luminary. Sun light is not homogeneous, being a triple compound of colorific rays, calorific and decomposing rays. As each of these properties in light vary in their degree of refrangibility, they become separated in passing through a prism, and can be seen or tested. The calorific portion is less refrangible than the others, the red ray containing a portion, but outside of the red ray, where there is no light, is found the greater portion of caloric. Each of the other colored rays are more refrangible than the red, the violet being the most so. The decomposing rays are the most refrangible of all, some being found in the violet, but outside of it, where there is no light, the greater portion is concentrated. The calorific portion being separated and diffused by refraction, warms the surface of our planet, and causes the formation and growth of all our organisms. The colorific rays beautifies its surface, and the decomposing portion reduces organisms to their original elements when their organic power ceases to supply material for a re-formation of others. Infinite wisdom is displayed in this arrangement, infinite power in its execution and infinite benevolence in its adaptations.

Wm. Partridge.

Binghamton, N. Y.

Coal and Wood as Fuel.

Wood generates heat more rapidly than coal; but a pound of the latter (anthracite) will evaporate three times more water than a pound of wood. As a compact fuel, coal, therefore, is the best for use in generating steam, because plenty of draft for rapid combustion can easily be obtained by a blower or a tall chimney.

As wood contains a great quantity of oxygen and anthracite coal none, less air is taken from an apartment when wood is used for fuel than when anthracite coal is used. This is the reason why the atmosphere of apartments heated with wood fuel produces, as it were, a more genial influence, and why such fuel is also more healthy for heating; also why it does not require such an amount of cold air from the outside to supply the fire.

Alloy for Composition Files.

The following is given by Prof. A. Vogel in the *Neues Jahrbuch fur Pharm*, as being the composition of those delicate files made in Paris and principally used by watchmakers for polishing steel pins, and for the production of the deep polish of some parts of watches—the alloy is of silvery whiteness. The analysis of a file of this description of 6 inches in length and 5 lines in breadth, made of a yellowish-white metal, which was very brittle under the hammer, and had a jagged fracture, gave—

Copper	64·4, or 8 parts.
Tin	17·6, or 2 parts.
Zinc	8·0, or 1 part.
Lead	8·6, or 1 part.

The author then melted the four metals together under a coat of borax in the above simple proportions. The alloy filled the clay mold well. It is so brittle that it can scarcely be worked with the file; the rods of metal are, therefore, best ground on a grindstone, to give them the surfaces required for each particular case. The alloy above mentioned gives files of as good quality as that employed for analysis. It has, probably, been obtained empirically by trials. The author has found that inconsiderable changes in the proportions of the metals exert a great influence upon the usefulness of the alloy.

Perfumery.

The extensive flower farms in the neighborhood of Nice, Grasse, Montpelier, and Cannes, in France, at Adrianople, (Turkey in Europe,) at Broussa and Uslak, (Turkey in Asia,) and at Mitcham, in England, in a measure, indicates the commercial importance of that branch of chemistry called perfumery.

British India and Europe consumes annually, at the very lowest estimate, 150,000 gallons of perfumed spirits, under various titles, such as eau de Cologne, essence of lavender, esprit de rose, &c. The art of perfumery does not, however, confine itself to the production of scents for the handkerchief and bath, but extends to imparting odor to inodorous bodies, such as soap, oil, starch, and grease, which are consumed at the toilette of fashion. Some idea of the importance of this art to commerce may be formed when we state that one of the large perfumers of Grasse and Paris employ annually 80,000 lbs. of orange flowers, 60,000 lbs. of cassia flowers, 54,000 lbs. of rose leaves, 32,000 lbs. of jasmine blossoms, 32,000 lbs. of violets, 20,000 lbs. of tubereuse, 16,000 lbs. of lilac, besides rosemary, mint, lemon, citron, thyme, and other odorous plants in like proportion. The quantity of odoriferous substances used in this way is far beyond the conception of those even used to abstract statistics, giving rise to an amount of industry truly gratifying.

The consumption of perfumery increases with the civilized state of society—it is strictly one of the arts of peace; it supplies one of our senses with a gratification, which, by use, becomes tutored to distinguish everything that is sweet to smell, and this art is certainly calculated to stamp the refinement of taste to one of our desires—the desire of pleasing the olfactory nerve.

To the chemical philosopher, the study of perfumery opens a book as yet unread; the practical perfumer, on his laboratory shelves, exhibits many rare essential oils, such as essential oil of the flower of the acacia farnesiana, essential oil of violets, tubereuse, jasmine, and others, the compositions of which have yet to be determined.

The exquisite pleasure derived from smelling fragrant flowers would almost instinctively induce man to attempt to separate the odoriferous principle from them, so as to have the perfume when the season denies the flowers; and thus we find the alchemists of old torturing the plants in every way their invention could devise for this end. Their experiments were not wholly unsuccessful; indeed, upon their foundation the whole art of perfumery has been reared, which observation applies to numerous other useful manufactures. Without recapitulating those facts which may be found diffused through nearly all the old authors on medical botany, chemistry, pharmacy, and works of this character, from the time of Paracelsus to Celnart, we may state at once the mode of operation adopted by the practical perfumer of the present day for preparing the various extracts or essences, waters, oils, pomades, &c., used in his calling. The processes are divided into four distinct operations.

Septimus Piesse.

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New Inventions.

New Wedge Pinch Bar.

The moving of a locomotive engine, when there is no fire in the furnace or steam in the boiler to assist, is not an easy matter. Yet it is a job that is often necessary to be done, especially in locomotive station houses, where the engines "put up;" also in repair shops, &c. If the track where the locomotive stands is slightly inclined, and it is necessary to move the machine up, even for a few feet, much care is required to wedge the wheels, else the engine will be likely to roll back in the wrong direction; great power must also be applied to effect the movement. For this purpose the leverage of a common crow bar is generally used; but the method is slow, and in some respects unsafe.

The present invention consists of a pinch bar, intended, especially, for use on occasions such as those to which we have alluded, but it may also be employed for the moving of all kinds of heavy bodies. It consists in a combination of a short lever of the first order with a long lever of the second order, and the addition of a self-acting spring wedge; the latter is so arranged that when the bar is applied to a wheel, the wedge will spring under, as fast as it moves, so that no ground can, in any case be lost. The improvement seems to obviate all of the objections which attend the use of the common bar, while it affords several important advantages over that implement.

Referring to the engraving, it will be seen that the apparatus is applied to the top of the rail, A, and operates on the lower side of the locomotive wheel, B. C is a short lever of the first order, resting upon a fulcrum pin, D, and connected at its back end, by means of straps, E, with the long lever of the second order, F.

One of the principal difficulties with all pinch bars is the tendency of their fulcrums to slip back when pressure is applied, and thus to become inoperative. This slipping tendency is augmented in proportion as the weight to be lifted is increased.

The fulcrum pin, D, is placed upon the rest piece, G; the lower end of lever F is also connected with G. G′ is a socket to which the end of lever F is attached; the socket is secured to rest G, by means of the bolt, H, seen in dotted lines. This bolt serves as a pivot for the rest piece, G′. The fulcrum, D, also turns on a pivot, D′, shown by dotted lines. The object of having G′ and D pivoted, is to permit the lever, F, to be slightly turned outward, clear from the locomotive, when the apparatus is introduced between the driving wheels. Otherwise the lever, F, would be likely to come in contact, when pressed down, with some parts of the engine.

The contrivance is secured to the rail and prevented from slipping back by means of the jaw clamps, I I; these are connected together at their lower ends by the straps, I′. The upper ends of the clamps, I I, pass through a saddle, J. If the saddle rises, the upper ends of the clamps, I, will be brought nearer together, and the lower ends or jaws opened, disengaging the apparatus from the rail. But when the saddle, J, falls, the upper ends of clamps, J, will be spread apart, and the lower ends or jaws made to gripe the rail. The saddle is bolted to the rest piece, G, and moves up and down with it. Fulcrum D, rests upon the piece, G; lever, F, is also connected to G by means of socket G'. The extremity of lever C, is now placed beneath the wheel, as shown in the cut, and power applied at F. The rest piece, G, is thus pressed down, and with it saddle J. By the descent of the saddle, the upper ends of clamps, I I, are spread, and their lower ends clasp the rail, holding on thereto with a force equivalent to the pressure upon rest G; consequently there can be no slippage, for the heavier the burden to be lifted, the firmer will the clamps take hold.

In front of the rest, G, there is a projecting shell, K, within which is a spiral spring, L, whose office is to push out the rod, M, and cause the head of the rod, M′, to press against the wedge, N. As fast, therefore, as the levers move the wheel, the wedge, N, will advance and block up the wheel; all wedging of the wheel by hand is therefore done away with.

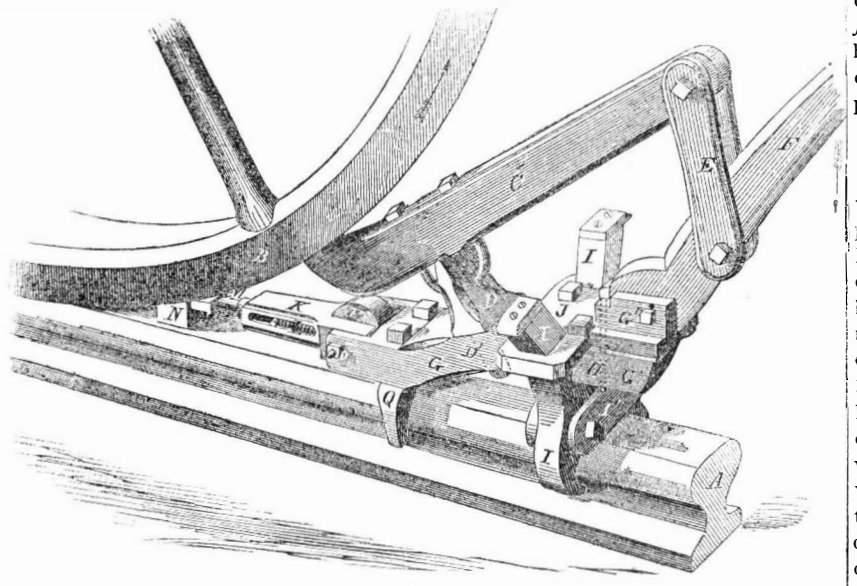
The bolt, O, serves to attach the shell, K, to the rest, G, and also as a pivot to the friction wheel, P. By throwing up the lever, F, the clamps become disengaged, and the apparatus may be shoved up towards the wheel, and a new hold taken. In moving the contrivance from place to place upon the rail, the wheel, P, supports the whole weight of the parts, like a wheel-barrow. Q are guides which keep the front part of the apparatus upon the track.

The force of the common pinch bar must, generally, be applied as far below the wheel as possible. This improvement touches the wheel nearly on its side, and therefore obtains an important advantage in leverage.

This invention strikes us as possessing many advantages. A single person may, by its use, move the heaviest locomotive, and block up the wheels at the same time. At first glance it might strike the observer that there are more parts employed than are necessary; but such is not the case; every portion has an important use, and all are combined in such a manner as to insure great strength. The contrivance cannot easily get out of order, appears to be very effective, costs only about $10 for construction, saves much time, labor, &c. Altogether it is a very desirable improvement; we commend it to the attention of railroad people.

Mr. H. N. De Graw, of Piermont, N. Y., is the inventor. It was patented Jan. 29, 1856. Further information may be obtained on application to the inventor, as above, or to Mr. Phillip Mabie, 330 Rivington st., New York City, assignee of one half.

IMPROVED WEDGE PINCH BAR.



On the Use of High Pressure Steam.

"Taking into consideration the superior economy of high steam, *worked expansively*, it is quite evident, that in all future constructions, either of boilers or engines, we must look forward to the use of a greatly increased instead of a reduced pressure of steam. Indeed, I am so thoroughly convinced of the advantages inseparable from this application, as to urge upon you the necessity of preparing for greatly increased progress, and greatly increased pressure in all the requirements, appliances, and economics of steam as a motive power. It must appear obvious to every reflecting mind, that steam generated under pressure, and compressed into one-fifth or one-sixth the space that it formerly occupied, and that again applied to an engine of little more than one-third the bulk, must be a desideratum in the appliance of an agent so powerful, and so extensively used. Look at our locomotives of the present day, and tell me whether we are or are not successfully progressing in effecting a clearer alliance between the two sister sciences of mechanics and physics; and tell me whether or not the community is not secured equally well from risk, and greatly benefited by the change? Let us calculate for example, the duty performed, and the force applied to one of our largest class of locomotive engines traveling with a train at the rate of 45 miles an hour, and we shall find the amount of power given out to exceed that of 700 horses, or as much as would be required to drive the machinery in some of our largest factories. And why not work our factories upon this principle? and why not propel our largest ships by engines of this description? There is no reason why it should not be done, and that with greatly increased economy, by introducing a well-directed system of condensation along with that of highly attenuated steam."

The above are the views (recently published) of Fairbairn, the eminent engineer; they are in harmony with those which have been advanced through our columns. Those who object to the general use of high pressure steam, however, advance very good reasons for so doing. They say, "high pressure steam will lead to more frequent boiler explosions; it is better, because more safe, to use low pressure steam." They maintain that as high pressure steam is but low pressure steam *compressed*, there can be no economy of fuel in its use—that the only economy obtained is simply the use of smaller engines occupying less space.

A new Anesthetic Agent.

A communication from Dr. Simpson, of Edinburgh, was read at the last monthly meeting of the Academy of Medicine, this city, on the use of carbonic acid gas as an anesthetic agent in uterine diseases.

The paper stated that in some cases the use of chloroform vapor was found to excite temporary pain and a sense of burning heat, while this agent produces a sensation of cold decidedly pleasant and refreshing. The production of this gas is made by carbonate of lime and sulphuric acid in proper proportion mixed in an ordinary bottle carefully stoppered; the cork being perforated by an india rubber tube of any desired length. Dr. Simpson's paper alluded to the antiquity of the use of carbonic acid gas by the ancients, who used it in many ways unwittingly, especially in the fumigations by the burning of perfumed woods and aromatics, the virtue of which arose from the gas evolved in the combustion. Various cases were given of diseases cured or of symptoms relieved by the administration of this anesthetic.

Dr. Simpson was the first to discover the anesthetic properties of chloroform. Carbonic acid gas is a dangerous agent—far more so, we believe, than chloroform.

Artificial Legs.

A manufactory has recently been opened in this city (New York) at 378 Broadway, for the manufacture of Palmer's artificial legs. The public generally and even the medical profession have but a very inadequate conception of the importance of the manufacture of artificial limbs or the consummate ingenuity and perfection of their mechanism. We are told that Palmer's limbs are worn by many ladies and gentlemen in New York and other places; so admirably constructed is the mechanism of the joints that the fact of mutilation is effectually concealed, and defies detection. A medical gentleman tells us th he often sees a lady promenading Broadway whom nobody suspects of having undergone amputation; she wears an artificial limb made by Palmer & Co., and for all the purposes of ease and gracefulness in walking it is equal to the uninjured limb.

Some persons make very ungraceful uses of the legs which Providence has given them; others, the fair sex more especially, complain of the large size that nature furnishes. A complete remedy for all these evils is provided by Palmer & Co. Their legs are made to order, warranted light, easy, and, if need be, *fashionable*. The old stumps, it is true, would have to be removed; but, with the aid of chloroform, that operation would be full of pleasure.

Plowing with Steam Power.

At a meeting of the London Society of Arts which took place on the 1st of last month, a paper was read on the above subject by John Fowler, of Bristol, which elicited considerable discussion. No less than fifty-three patents have been taken out in England for various methods of cultivating the soil by steam power, the first of which dates as far back as 1630. The inventor was David Ramsey, and his object was to employ the old fire engine of the Marquis of Worcester. The next patent was taken out by F. Moore in 1767. His plan was, to use a steam carriage traveling over the land, and drawing the plow. So confident was the inventor and some of his friends of success, that they sold their horses to avoid loss by their reduction in value. Patents have also been obtained for applying steam to stationary engines, using an endless rope and windlass to draw the plow.

At the meeting of the Royal Agricultural Society held at Carlisle in July, 1855, four steam plows were exhibited, but none of them seemed to give satisfaction. From the discussion which ensued on the reading of the paper, we draw the conclusion that plowing by steam in England has thus far proved a practical failure. *The* steam plow has yet to be invented. The method of actuating the plow by an engine stationed in one part of the field, drawing the plow by long endless ropes passing over pulleys, seemed to meet with the most favor. We, however, cannot conceive how this clumsy system can ever come into use. It must be more expensive than horse power. The only proper method of plowing by steam that afford hopes of success, in our opinion, is the locomotive engine traveling over the ground and drawing the plow. The engine must be made light and strong, for a heavy engine and boiler will sink the wheels so deep in the soil that it will consume all the steam power to move them. Perhaps a portable revolving railroad on the wheels to obviate this difficulty, may yet be successfully invented.

Plurality of Worlds.

Prof. Agassiz believes that there is internal evidence that the organic beings of this globe form by themselves a complete system, which does not admit of the supposition that there are other members of the system living elsewhere; and any animals in other systems cannot be constructed on the same plan of organization.—[Exc.

Sir David Brewster and others have presented like views; but inasmuch as Britain possesses a milder climate than the State of New York, although situated from 14° to 20° further north, and this by a cause (the Gulf Stream) which could never have been found out by theorizing, so there may be in other planets peculiar conditions of which we are entirely ignorant. It therefore has appeared to us that the speculations of Dr. Chalmers, Brewster, and other men of science, relating to the planets being inhabited, may be set down as a kind of poetical effusions.

Fine Polishing Powder.

We have received from James G. Sanborn, of Cherryfield, Me., a specimen of a substance found deposited on the shore of a pond in the vicinity of that place, and which is excellent for polishing gold and silver. It is of a beautiful snowy white appearance, very light and soft. It appears to be very fine chalk, deposited from water in which it had been held in solution.

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Science and Revelation.

The history of our globe, as given by geologists generally, from their interpretation of the remains of animals and vegetables found in the earth's crust, has excited much controversy among men of science—divines and scholars—during the past half century; and the controversy is still carried on with no small amount of vehemence. The main subject of discussion is the account of the Creation in the first chapter of the Bible. The general belief entertained from of old regarding the meaning of this chapter, is that the acts of distinct creations, described therein took place during *days* like those we now enjoy—of twenty-four hours duration; also, that the period of time which has elapsed since those grand events, amounts to about six thousand years. Soon after geology commenced to be studied as a science, this interpretation of the acts of Creation began to be disputed, by geologists asserting that the rocks presented evidence of the far greater antiquity of the earth, and that the *days* of Creation mentioned in Genesis meant great epochs of time —perhaps millions of years. Fifty years since Dr. Chalmers, combatting the views of those who asserted that geology taught infidelity, said, "this is a false alarm; the writings of Moses do not fix the antiquity of the globe." Since then great has been the number of essays and books which have issued from the press, discussing the question *pro* and *con*. These are too numerous for us to mention; our present object is, principally, to notice two of the most recent, viz., the work of Taylor Lewis, Prof. of Greek in Union College, Schenectady, N. Y., and an elaborate Review of it in the last number of the *Bibliotheca Sacra*, by Prof. Dana, of Yale College.

Prof. Lewis, who is stated to be deeply learned in the Hebrew language, admits that the *days* mentioned in the first chapter of Genesis mean great epochs of time, but he casts aspersions on Geology, men of science, and science itself. We admit that certain theorizings of individuals, like the writings of Aristotle, may pass current for science; but it is "science falsely so called." Real science is simple truths or facts arranged or set in order; it is nothing more; Prof. Lewis does not clearly make this distinction, and Prof. Dana has answered him correctly and ably in defence of science.

We will now endeavor to present the substance of Prof. Dana's account of the history of Creation, because it is the latest, clearest, and best we have seen, and must be of interest to every son of Adam. He states that Geology proves our earth to have been at one time a fiery ball in space; then dry land and seas appeared, with a tropical climate over the whole globe. At a later period, mountains began to enlarge, the dry land to expand, a temperate climate to gather about the poles, and tribes of animals became more localized. Then, in the last age before man, the continents take their full breadth; rivers flow, everywhere valleys are formed; the zones of climate became nearly like our own, and every region of the globe has its peculiar fauna. "Finally, the features, and climates, and life, attain all their present variety, as man appears to take his place at the command of his Maker."

His ideas regarding the production of light are peculiar, and as we have seen the same views before, and now find them endorsed by Pro. Dana, we presume they are accepted as the most correct theory of light by all who have paid any attention to the subject. He says, "without mutual molecular action, there could be neither light nor heat. But let it be endowed with intense *attraction* of different degrees or conditions, and it would produce light as the first effect of mutual action begun. The command, 'Let light be,' was the summons to activity in matter." The plain meaning of this is, that the matter composing the earth was in existence before the law of gravity, and that when it (matter) was endowed with gravity, the mutual action resulting therefrom produced light; in other words, light is an effect of the law of gravitation.

The records of the rocks, Prof. Dana asserts, declare that the creations of the animal kingdoms came not forth all at once, but in long progression. There was an age when shell-fish, such as cuttle-fish, corals, and trilobites, were dominant. The earth was then too warm, and the atmosphere too impure for more exalted forms. "This was the Silurian age of geological science." The next age was when fishes filled the seas, which is the Devonian of Geology. Then followed another, when reptiles, frogs, and salamanders commenced. Land plants then came forth, and were of exuberant growth, to abstract carbonic gas from the atmosphere and purify the air. The vegetable products of that age are now found in our coal fields. After this came the "Reptilian age," when there were reptiles larger than whales in the water; leviathan reptiles on land, and flying reptiles in the air.

In each of these ages there were distinct creations succeeding to exterminations of previously existing life. "Through the Silurian, Devonian, Carboniferous, and Reptilian ages, in America—fifteen times at least the seas were swept of their species, and in the succeeding epoch not a species of the former occurs." All this occurred during the *fifth* day of Genesis, according to geologists, which may have occupied a period of more than a million of our years.

The next epoch, *the sixth day*, was the advent of man, and the more perfect mammals, and Prof. Dana asserts with other geologists, that "the whole plan of creation had evident reference to Man, as the end and crown of the animal kingdom," and science has no evidence that any living species have been created since his appearance on this globe.

There is no dispute whatever in regard the order of creation; geologists assert that the *orders* of creation described in Genesis, exactly accord with geological science, and the *records* of the rocks and Scripture are in perfect harmony. The only subject of dispute, then, is in reference to the question of *time*; there is not, and cannot be, any conflict between "Science and Revelation."

Gold and its Uses.—No. 3.

Extracting Gold—The question of greatest importance, and the only one to which *most special* attention should be directed at present, is the extracting of gold from quartz in the most expeditious and cheapest manner possible. This embraces no less than three processes: the crushing of the quartz, the extracting of the gold from it, and then the separation of the gold from its amalgam.

The best machine for crushing quartz (some assert) is the old fashioned stamping mill, having its metal stampers so made that they can be turned to act on four sides, one after another, as they wear out. Then there is the old Chilian mill, composed of heavy rollers passing over the quartz; there is also the *ball* quartz crusher, and various other machines, the majority of which worth noticing have been illustrated in the columns of the Scientific American. There is also another class of machines, those designed to embrace crushing, washing, and amalgamating, at one continuous operation, such as the machine illustrated last week on page 209.

One principle of operation positively necessary in recovering the gold from quartz is to grind the quartz to fine powder, and to use friction and water to bring all the gold in the ground quartz into contact with the mercury. No subject has been more voluminously discussed, during the past three years, than this one—"the best method of extracting gold." Week after week the London *Mining Journal* has contained letters from various correspondents, each giving his own experience, and insisting on the correctness of his own opinions. Experienced miners from California and Australia have long battled against one another, then "sheathed their swords for lack of argument." We had thought the controversy ended some time since, but in the most recent numbers of the *Mining Journal* we notice that it has broken out again. One correspondent asserts that the old stampers are the best crushers; another that crushing rollers are the best. One asserts that gold can be recovered from quartz without mercury, by simply washing, while another asserts this to be impossible. One recommends the roasting of the quartz previous to grinding, while another condemns this as being a most expensive process. And what is very strange, these controversialists do not present the views of mere theorists, but those of men who have worked at the mines, and who have had experience in the extraction of gold from its native matrix. All this affords evidence that a perfect system for extracting gold from quartz has either yet to be discovered, or else, if there is one in existence, it is but imperfectly known. Our object is to direct attention to improvements—to lead men to think, experiment, and devise.

California—The *American Mining Magazine*, published in this city—a truly scientific work—states that there is gold enough in California to employ the labor of centuries, but it can no longer be obtained as formerly The time has gone past in that country for making fortunes by the simple pickaxe, spade, and pan—by hand labor. Machinery and capital are now required for obtaining the royal metal. The character of California mining has entirely changed since 1850. Shafts have now to be sunk to an immense depth, tunnels run far into the mountains, extensive dams erected, and flumes carried from rock to rock, over deep valleys and extensive ravines. All this requires capital and combined labor. In Neveda County—an extensive field for quartz mining operations—there are sixteen quartz mills in successful operation; five are run by water, and the others by steam and horse power. There are about $2,000,000 invested in this kind of mining, and the *Mining Magazine* says: "This amount will be doubled in a few years, for it is proved beyond dispute that quartz veins are not only remunerative but inexhaustible." There is, therefore, before our country now, fields for gold mining of boundless extent, and exhaustless produce; therefore the gold interests of the United States —which previous to 1848 were of but feeble importance—are the greatest in the world with perhaps but one exception, those of Australia. Those interests, therefore, now claim a large share of, and deserve still more public attention.

Chemistry of Gold.—Gold is not easily acted on by acidulous agents, still there are two definite oxyds of it. When gold is fed into a vessel containing *aqua regia*—nitro muriatic acid—which contains free chlorine in the nascent state, it is dissolved, and a per-chloride of gold formed, which is a red, deliquescent, crystalline compound, soluble in water, ether, and alcohol, and is decomposed by light and heat. When proto-chloride of tin is added to a solution of per-chloride of gold, a fine purple precipitate is formed, which is called the "purple of Cassius," and is used in porcelain painting, and for tinging glass a red color.

Gold dissolved in nitro muriatic acid can be precipitated by adding to it a solution of the proto-sulphate of iron. The gold subsides to the bottom of the vessel containing the solution, and forms a brown powder, which, after being washed in hot water, then digested in hot dilute muriatic acid, is again washed, and forms the pure gold employed in gilding china or porcelain ware. It is intimately commingled with honey and a little borax, as a vehicle, is painted on the ware with a pencil, burned in a kiln, then burnished afterwards. Great care is exercised in mixing this gold powder, so as not to press it too hard, as this readily brings it into its metallic state again. Gold dissolved in *aqua regia* can be reduced to a crystalline state by simply driving off the acid, by exposure to heat on a tile in an oven. This crystal gold can be reduced to a metallic state again by simple pressure, and it has thus been used for filling the cavities of decayed teeth. We have also seen a ring of good metallic gold made from crystal gold pressed into a fine mold.

Silver and copper are harder than gold; hence, mixed with these metals, it produces an alloy harder than itself. The gold employed in jewelry is much adulterated. The skilful jeweler can give different shades of color to golden ornaments by exposing them to different chemical agents, which dissolve a portion of the copper and silver alloy, while they do not touch the gold. The following is a French jewelers' receipt for brightening gold jewelry: Take two ounces of saltpeter, one of common salt, and one of alum, and dissolve them in a pint of hot water. Ten ounces of jewelry boiled in this for twenty minutes will have obtained a bright and beautiful color, after which they are to be taken out and washed well in warm soft water, and dried. The surface of the gold will have a dull appearance, but it can be made lustrous by burnishing.

A solution of gold in ether applied to the surface of fine polished steel instruments gilds them—the ether being driven off with heat. Fine articles of cutlery are thus gilt sometimes. The per-oxyd of gold will combine with ammonia and form a brown powder, terribly explosive when heated to 290°, touched with an electric spark or rubbed by friction.

Voice of the New York Senate.

We are happy to announce that the resolution lately brought before the Senate of the New York Legislature, instructing Senators and Representatives in Congress to use their votes and influence against the extension of the Woodworth patent, has passed by a triumphant majority. Indeed the whole Senate voted in favor of the resolutions except a few members who either went in the negative or did not desire to put their names on record. The resolve was carried by 24 ayes; nays only 4. This sweeping majority is a correct indication of the popular feeling upon the subject; it is only occasionally that opportunity occurs for a favorable expression of the public will in these matters. We believe that the above emphatic result will have great effect at Washington.

The resolutions alluded to were introduced by the Hon. Erastus Brooks, Senator from New York City. In a speech of great ability he portrayed the magnitude of the privileges enjoyed by the Great Monopoly, and the injustice of allowing it to continue longer. For his earnest and successful labors in this cause he is entitled to the lasting gratitude of the public.

The career of Senator Brooks as a Legislator, although not yet very extended, is a noble one. In every movement that affects the interests and prosperity of the people he is sure to be found upon the right side. He is an earnest and efficient worker—an honest and rising man.

Recent American Patents.

Method of Straining Saws.—By T. Sharp, of North Greenbush, N. Y.—Consists in placing a strong elliptical, upright spring behind the saw; the spring is pivoted in the center; each end of the saw is connected, by means of a stout cord, with one of the ends of the springs; the cords pass over friction rollers; the elasticity of the spring keeps the saw constantly strained, and at the same time permits the requisite up-and-down movements. This is a cheap method of straining mulley saws.

Machine for Cutting out Boot and Shoe Soles.—By William Wells and Mellen Bray, of Turner, Me.—Consists of a peculiar arrangement of knives, whereby the soles are cut out into the exact form, the edges beveled or skived, and the groove or rand formed on the under side for the stitches. The three operations are all done simultaneously, with great rapidity and exactitude.

Bench Hook for Carpenters—By Clinton W. Clapp, of Wappinger's Falls, N. Y.—This invention consists in the employment of a sliding jaw attached to a shank formed of two parts, said parts being connected in a peculiar way, and having beveled ends, so that they may be operated like a wedge and secure the sliding jaw at the desired point, when said jaw grasps or is forced into the piece of work to be held.

Pen and Ink.—By A. F. and C. M. H. Warren, of Brooklyn, N. Y.—This is an improvement in Fountain Pens. The pen holder is made hollow, and serves as an inkstand. The lower extremity of the holder is tapped so as to permit the escape of the ink to the pen. One point of novelty consists in a peculiar arrangement of a piston within the handle, so

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as to assist in regulating the flow of ink. Pens of this description are very convenient.

Improved Parallel Ruler—By R. Eickemeyer, of Yonkers, N. Y.—This invention consists in a ruler with certain novel appliances whereby it can be moved to rule parallel lines at equal or otherwise graduated distances from each other, with the utmost convenience and accuracy. Diagrams would be required to show its construction.

Improvement in Lime Kilns.—By Job Sands, of Sand's Mills, N. Y.—The inventor says that in the ordinary kilns the air for supplying draught to the fire is admitted below the grates, which causes the heat to ascend and strike the arch of the fire-place, whereby a portion of the heat is absorbed, and another portion lost by reflection. The improvement consists in arranging the air draught on a line with the top of the fire, so that all the heat will be carried directly into the boiler. This plan is said to effect a considerable economy.

Recent Foreign Inventions.

Dyeing Fast Black on Woolen Goods.—On page 158 we presented an account of a new method of dyeing woolen cloth black by a mordant of the bichromate of potash and a topical application of logwood and the sulphate of indigo. At the time of publication, we stated that in all likelihood *cam wood* was employed with the logwood, although this was not mentioned in the magazine from which we obtained the information. In the last number of *Newton's London Journal*, received last week, a fuller account of this process is given, and it is stated that four pounds of cam wood are added to every 100 lbs. of logwood, thus confirming our opinions.

A new Product of Castor Oil.—A patent has been obtained by George F. Wilson and George Payne, of London, for an improvement in treating oils to obtain a new elastic product. Castor oil is placed in a still, and the temperature of it is raised to 600 or 650° Fah. —super-heated steam being used in heating. As the act of distillation goes on at this heat, it is found that when about one half of the contents of the still have passed over in the form of fat acids and glycerine, a few drops of a milky-white substance also comes over. The heat is then cut off, and the distillation stopped. On the interior of the still there is now found a peculiar spongy elastic matter, which has an offensive odor, which is removed by a current of low pressure steam and washing with a solution of the carbonate of soda. We understand that this elastic product possesscs some of the qualities of india rubber.

Preserving Vegetable Substances—F. J. Anger, of London, has taken out a patent for preserving potatoes and other like vegetable substances, by dipping them in a warm solution of diastaste, or gum made from starch. Some of this gum is dissolved in water which is heated up to about 140° Fah., and the vegetable substances are then introduced into it, and kept at that heat until imbued with the solution. The vegetables are then taken out and placed in drying rooms until they are completely dried. Potatoes, when so treated, are stated by the patentee not to be susceptible of decomposition, by the influence of the atmosphere.

Paper from Tan Bark—J. and T. Horton, of London, have obtained a patent for manufacturing a paper, suitable for pasteboard, from spent tan bark.

Extracting Castor Oil.—H. A. H. Durant, of London, has obtained a patent for extracting a very clear oil from the castor beans. The outer skin is first removed by rollers previous to the crushing and heating of them. This simple improvement produces a clear and fine oil, which it is proposed to call "castrine," the outer cuticle being then applicable for manure and other purposes. By this process, the thicker portion, or stearine, which is now lost (by being mixed and left with the outer skin or cuticle) is obtained, and the oleaginous or thin portion of the oil is not colored and deteriorated. The oil thus obtained can be purified by jets of gas, acids, and heat, at about 150° to 160°.

Manufacturing Iron—J. Berch, of Birmingham, Eng., has obtained a patent for an improvement in processes for manufacturing iron —the improvements relates to the furnaces. In arranging furnaces, he builds a refinery furnace at the back tuyere, and employs reducing and oxydizing tuyeres to smelt and refine at one operation, so as to dispense with the fuel now required for the common refinery fire. He runs the metal from the blast furnace at once into the refinery furnace, so as to melt and refine the metal at one continued heat.

Smoking Tobacco and Cigars.

A French chemist has recently been trying some experiments on the smoking of tobacco and cigars, to discover the reason why a cigar, when partially smoked, extinguished for a short time and ignited again, has such an unpleasant flavor in comparison, with what it had when first smoked. His intention also was to ascertain the quantity of nicotine absorbed by tobacco smokers. The apparatus used consisted of a stone jar, in which the tobacco was made to burn, connected with a series of bottles communicating by tubes. The bottles were either empty, or contained some water and water mixed with a little sulphuric acid. From a few experiments it was found that, in the smoke of tobacco extracted by inspiration, there is ten per cent. nicotine. Thus a man who smokes a cigar of the weight of seventy grains, receives in his mouth seven grains of nicotine, mixed with a little watery vapor, tar, empyreumatic oil, &c. Although a large portion of this nicotine is rejected, both by the smoke puffed from the mouth, and by the saliva, a portion of it is, nevertheless, taken up by the vessels of the buccal and laryngeal mucous membrane, circulated with the blood, and acts upon the brain. With those unaccustomed to the use of tobacco, the nicotine, when in contact with the latter organ, produces vertigo, nausea, headache and somnolence. From further investigation it was found that the drier the tobacco the less nicotine reaches the mouth. A very dry cigar while burning yields a very small amount of watery vapor, the smoke of it therefore cools rapidly in the cigar, while passing from the point of ignition to the mouth; hence it is that the first half of a cigar smokes more mildly than the second, in which a certain amount of watery vapor and nicotine, freed by the first half, are deposited. The same remark applies to smoking in pipes. Smoking through water, or with long tubes and small bowls, prevents in a great measure the nicotine from reaching the mouth and being absorbed.

The new Frigate Merrimac.

This steamer, which lately sailed from Boston on an experimental trip seaward, has returned, and her performances are said, in the papers, to have been "perfectly satisfactory." She is paraded as the most complete and effective steamer in the American navy, and has been ordered to Annapolis, Md., near Washington, so as to afford an opportunity for Members of Congress to examine and admire her wonderful qualities, and then vote a few millions more for another crop of similar boats.

We have been informed, in a private manner, for the correctness of which we will not vouch, that the machinery of the *Merrimac* proved, on the late trial, to be a miserable failure; that the highest speed obtained was nine miles per hour, and forty-five revolutions of the propeller per minute, while the average speed was only seven miles per hour. If this is so, she is a disgrace rather than a credit to the country, and the treasury has been robbed for her construction more than it ever ought to be again for such a purpose.

It is a singular fact that no public statement of the speed of the *Merrimac* has heretofore been given. What does it all mean?

Cotton Seed and its Uses.

A recent number of the *Railroad Record*, Cincinnati, contains an excellent article on the above subject. It states that cotton seed yields 30 per cent. of oil, and that the total product of oil that could be obtained from the seed raised in the United States would amount to 671,940,000 lbs.—the residue being oil-cake, amounting to 1,567,860,000 lbs. Edgar Conkling, of Cincinnati, has invented a process for making soap from the seeds without expressing the oil from them.

Earthquakes.

Recent accounts from Japan describe a terrific earthquake which took place at Jeddo, the capital city of that island, on the 11th of November last, by which 100,000 houses were thrown down, and 30,000 of the inhabitants killed. As the houses in that city are very small and numerous, and as the inhabitants, no doubt, rushed out from them when the first shock was felt, this will account for the great number of buildings destroyed in proportion to the number of persons. Still, the destruction of 30,000 lives by one earthquake proves it to have been one of the most terrible that has ever taken place.

On the 15th of last month, at night, several severe shocks of an earthquake were felt in San Francisco. The vibrations of the earth lasted about thirty seconds, and waked every person in the city. Bedsteads placed on casters were rolled across the floors, doors were wrenched from their hinges, large iron safes were moved out of their places, walls of buildings were cracked, clocks stopped, and other damage done, but no lives were lost, although every house in the city was swayed to and fro. The shocks were felt throughout the most part of the State.

There are two theories respecting the cause of earthquakes. 1st. The igneous theory; which maintains that this earth was once a molten fiery ball, and that its interior is still a fiery mass, and is sometimes caused to generate waves, which produces oscillations on the earth's surface. 2d. The electric theory; which attributes the shocks to disturbed magnetic action in the crust of the globe—that the shocks are nothing more than powerful electric shocks.

As earthquakes are local, those who dispute the igneous theory assert that if the interior of the earth were a molten mass, and earth quakes were caused by waves of this fluid, then the oscillations would be felt equally strong on every part of the earth's crust.

Explosions of Boilers.

On Wednesday, last week, a boiler exploded in a small factory belonging to Erhardt Beck, in Alder st., Phila., by which a number of persons were killed, and the building shattered to pieces. The boiler was an upright one, and the head was blown out. The Coroner's investigation established the fact that the explosion was caused by over-pressure of steam. It was a poor boiler, and was purchased second-hand two years ago, from another person who also had purchased it second-hand.

The following is the verdict of the jury:— "That Charles Eckhardt and Herman Eckhardt, came to their death by an explosion of a steam boiler in the manufactory of Erhardt Beck, Alder street, above Master, said explosion having been caused by gross neglect and carelessness, the said boiler being in an unsafe condition, and therefore the jury hold the said Erhardt Beck censurable."

There should be inspectors for boilers in every city, and no steam boiler should be allowed to be used without an Inspector's certificate. It is just as culpable to use such a boiler as the above in a factory, as to shoot a loaded cannon into a crowd.

Brittle Annealed Iron.

We have received another sample of brittle annealed iron from A. Hotchkiss, of Schnevus, Otsego Co. N. Y., which possesses the same characteristics as that described on page 184. The piece we then received was part of a plate; the piece we have now received is the fragment of a small tube. Where it was struck with a hammer it has broken off with an edge as clean as if it were cut with a chisel, and the appearance of it is like that of the cleavage plane of a crystal; the metal has evidently become peculiarly crystaline It is easily operated upon with a file, but from its nature it is totally unfit for use in a machine.

Cast-Iron Connecting Links.

G. W. Hildreth, of Lockport, N. Y., suggests the use of cast-iron connecting links on railroad trains, as a substitute for the wrought-iron links in use. After mentioning some cases where connecting links broke when locomotives run off the track, thus saving the lives of the passengers, he states that it would be well to make a certain provision for breaking the links when a locomotive or any ef the cars run off the rails. He says, "the great difference between wrought and cast-iron links, is, the former will only bend by transverse strain, while the cast-iron will instantly break, and thus disconnect the cars. Should it be urged that cast-iron links will be subject to break readily by a sudden starting of the engine, the engineer will always get notice of this by means of the bell rope, which runs through the train, and a spare link can then easily be substituted."

The Missing Steamer Pacific.

At the time of going to press no intelligence of the steamship *Pacific* had been obtained. She left Liverpool on the 23d of January, and has, therefore, been out more than fifty days. The *City of Edinburgh*, a Scotch steamer, saw the cabin furniture belonging to some vessel on a field of ice, when on her last voyage to Europe; but there is no positive evidence that such furniture belonged to the *Pacific*. The current opinion respecting the fate of this steamer is, that she is lost. It is supposed that she came in collision with an iceberg during the night, while running at a high speed, making efforts to accomplish a short voyage, in competition with the *Persia*. This may, and may not have been the case. We have but faint hopes now of her safety; but we believe that some evidence of her fate will yet be gathered. But when we remember the fate of the *President* and the *City of Glasgow* steamships, not a relic of which has yet been found, so it may be the case with the *Pacific*, but we hope not.

Colored Flames.

Hydrogen gas burns with a blue flame; strontium with a red flame; copper oxyd with a green flame, and many substances with a yellow flame, such as the common gas used in our streets. The cause of this must be owing to the forms of the particles or atoms undergoing combustion. They must be of such forms as to reflect their peculiar colors, like a prism.

When boracic acid is present in minerals it is well known that they burn with a beautiful green flame; and Prof. Forbes, of Edinburgh, has recently discovered that chlorine produces the same result. A jet of chlorine directed upon the flame of a spirit lamp or coal gas, produces a jet of green flame. When burning alcohol is injected into a globe filled with chlorine gas the alcohol burns at the mouth of it with a flickering green flame. When hydrochloric acid is dropped cautiously on the flame of burning alcohol a greenish tinge is observable.

Hitherto a green colored flame has been considered by minerologists and chemists as affording positive evidence of the presence of boron; but since it has been discovered that chlorine produces the same effect this test is valueless, especially when, as it often happens, chlorine and boron occur together.

Body Braces.

One of the London tailors has taken out a patent for a waistcoat which combines the two-fold convenience of being a waistcoat and a pair of braces at the same time. One of the English papers says: "It is a very happy thought, and very well rendered into a comfortable and most convenient garment."—[Exchange.

Button eyelets may be sewed on the inside of a vest to answer the purpose of braces; but these should be made of some elastic substance. We, however, like the braces best. They are superior to any other means for upholding pantaloons, such as waist belts or back straps and buckles. Braces support the weight of the pantaloons from the shoulders, and is the most healthy method.

A Large Cargo of Cotton.

The ship *Morning Light* recently sailed from Mobile, Ala., with a cargo of 5869 bales of cotton, valued at $251,217.

Natural Rights of Inventors.

We will publish, next week, an able article by the Commissioner of Patents on the above subject.

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TO CORRESPONDENTS.

J. B.,of R. I.—The method to which you refer for enlarging the bottom of a hole drilled in a rock, was the use of an acid to eat the stone. A better plan is an instrument invented and used by Mr. Bogardus, for enlarging the roots of holes made in a rock to receive the foot rods of an iron tower built in this city. Granite is very difficult to quarry. It requires a great deal of practical skill to take advantage of the cleavage planes.

J. A. S., of Phila.—A centrifugal cannon to project balls by steam would not be patentable, because such a cannon is not new, In 1844 or 5, we forget which, such a cannon was tried near this city. Its principle of construction is wrong.

J. P., of Pa.—The soles of india rubber shoes are fastened under pressure with a cement made of a solution of india rubber, dissolved in turpentine. We do not know the name of the plant you have sent us.

E. M. H., of Va.—Vulcanized india rubber tubing will convey water at one hundred and fifteen degrees of heat without allowing a single drop to escape. We do not know its price. No cloth tubing that we are acquainted with will do it, and in all likelihood india rubber is not suitable for your purpose.

D., of Montreal—If you use a float in the boiler made of a hollow globe of copper, and attach it to a valve by a rod, to open the valve when it descends below the water line, and operate a steam whistle, your end will be accomplished: any machinist will make you such an alarm.

M. P., of Vt.—You have done wrong, for your own sake, in not securing the inventions described by you.

D. W., of N. Y.—We are much obliged to you for the diagram; but we published one on page 75, Vol. 3, Sci. Am. A good work on millwrighting is desired generally.

W. H. W., of Ala.—To lay the iron grooved rails for wagons, you must nail them on flat plank secured to sleepers, and it requires the middle of the road to be graded so as to shed the water. The plan, however, deserves your further consideration.

L. C., of Conn.—The excess of centrifugal force in the globe referred to by you, illustrated in our columns, overcomes that of gravity in the globe, and this sustains it horizontally. When the centrifugal force is diminished, it ceases to sustain itself horizontally.

S. P., of ——.—Wooden combs are made by machinery. In No. 25 there is a short article on needle making; needles are now made at Newark, N. J.

A. N., of Conn,—Dilute the nitric acid in six times its weight of water. If you add a little prussian blue to yellow lacquer, you will give it a greenish tint.

J. T. B., of Pa.—Your views respecting the "perpetual motion" may be correct. There are various methods that might be cunningly applied to keep it in motion.

E. C., of Ohio—Have you seen the extract in one of the New Orleans papers, to the effect that a Mr. Barnes, of that city, manufactures soap from cotton seed, which he sells at six cents per pound.

F. W., of ——.—Oil will mix with alcohol by first reducing it to a soap with an alkali. It will then make a t ansparent soap. Pictures are transferred by wetting the paper on which they are printed in an alkaline lye, like that of potash, then placing the pictnre face down on the dry piece of wood or stone to which you wish to transfer it, and pressing it with an instrument, such as a book folder or a roller. The paper may then be rubbed off. The alkali softens the ink of the picture, and the wood or stone absorbs this ink. There is no benefit to be derived from coppering the top of iron lightning rods.

W. M. W., of Pa.—If your cement is new it can probably be patented. You do not state how it is made, and therefore we cannot determine as to its patentability.

F. F., of ——.—We doubt whether a patent could be had for your method of uniting papers: it does not appear to differ, in principle, from the common plan of uniting by eyelets; neither do we see any advantages.

C. W., of N, Y.—You may be right regarding the perpetual motion, but there is no use in speculating; we could devise how the job could be done by several different plans.

J. H. F., of N. Y.—Your pump devices, we think, are patentable; your method of enveloping cannon balls with lead is very old.

M. B. D., of Phila.—You can find garacine at any of the places where dyewoods are sold for calico printworks.

S. M., of Ind.—We know of no work on iron railings.

H. E. S., of Pa.—Your method of applying heat to drive a lathe could not be patented. You will be unable to get power enough for the purpose.

G. H. W., of Wis.—See Vol. 7, for Stave Dresser. Have written you about the seed sower.

H. S. W., of Pa.—According to our understanding of the patent laws, no person has a right to *manufacture* an article in territory for which a paient on the article is held by another party.

T N. J., of Mass., asks "Is a one-horse power steam-engine (so called) Reed's Chronometer for instance, capable of giving out as much power as two men of ordinary strength working at cranks? If it will, I want one; but I am much in the fog on the subject of horse powers." In reply, we would state that a one-horse power engine, such as you describe, would, if properly made, do the labor of five men working on a crank of the same stroke as the crank of the engine.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, March 15:—

A. F. W., of Ky.; H. & N., of Ind.; A. McD. S., of Ala.; J. S., of N. Y.; N. A., of N. H.; P. J. C., of Conn.; R. D., of Pa.; B. F. J., of Mass.; H. K., of Mass.; C. H. R., of Me.; E. & A. W., of N. Y.; J. McL., of Mich.; H. L. B., of N. Y.; C. C. of Conn.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, March 15, 1856:—

G. M., Jr., of Ill., $30; W. & C., of Md., $30; J. B H., of N. H., $30; T. W., of Pa., $30; N. & H., of Ind., $20; E. K., of N. Y., $10; L. K. S., of Conn., $55; J. M. W., of N. Y., $30; A. F. W., of Ky., $15; J. C. G., of O., $12·57; W. D. W., of O., $50; J. R., of Ill., $33: S. H. & Mc W., of Pa., $30; R. E., of N. Y., $30; A. E. K., of Conn., $30; E. B., f N. J., $30; S. & S., of Conn., $30; N. A., of N. Y., $1; W. C. M., of N. J., $30; W. S., Jr., of Pa., $55; J. H. O., of Pa., $30; J. P. C., of N. Y., $55; C. H. R., of Me., $7, S. N., of Tenn., $30; P. J. C., of Conn.; $20; C. R. B., of N. Y., $30; J. E. & E. J. P., of Conn., $30; A. B. W., of Conn., $55; J. McL., of Mich., $25; H. K., of Mass., $25; E. E., of Ill., $30; H. B., of Conn., $55; J. S., of N. Y., $25.

Important Items.

Models—We shall esteem it a great favor if inventors will always attach their names to such models as they send us. It will save us much trouble, and prevent the liability of their being mislaid.

Patent Claims—Persons desiring the claim of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and enclosing $1 as fees for copying.

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THE UNDERSIGNED having had Ten years' practical experience in soliciting PATENTS in this and foreign countries, beg to give notice that they continue to offer their services to all who may desire to secure Patents at home or abroad.

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An able corps of Engineers, Examiners, Draughtsmen, and Specification writers are in constant employment, which renders us able to prepare applications on the shortest notice, while the experience of a long practice, and facilities which few others possess, we are able to give the most correct counsels to inventors in regard to the patentability of inventions placed before us for examination.

Private consultations respecting the patentability of inventions are held free of charge, with inventors, at our office, from 9 A. M., until 4 P. M. Parties residing at a distance are informed that it is generally unnecessary for them to incur the expense of attending in person, as all the steps necessary to secure a patent can be arranged by letter. A rough sketch and description of the improvement should be first forwarded, which we will examine and give an opinion as to patentability, without charge. Models and fees can be sent with safety from any part of the country by express. In this respect New York is more accessible than any other city in our country.

Circulars of information will be sent free of postage to any one wishing to learn the preliminary steps towards making an application.

In addition to the advantages which the long experience and great success of our firm in obtaining patents present to inventors, they are informed that all inventions patented through our establishment, are noticed, *at the proper time*, in the Scientific American. This paper is read by not less than 100,000 persons every week, and enjoys a very wide spread and substantial influence.

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25 6*

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FILMER & CO., Electrotypers, and Manufacturers of Electrotype Materials, 123 Fulton st., N. Y. Molding Presses, Batteries, Cases, Backing Pans, Shaving Machines, Metal Kettles, Planes, Blocks, Building Irons, etc., etc., on hand, or furnished at short notice, and at moderate charges. Adams' Improved batteries and black-lead machines also for sale. 23 tf

LINEN MACHINERY—JOHN R. McNALLY Champlain, N. Y. Agent for the sale of linen machinery of every description, new and second hand. Engineers and machinists tools, and linen yarns of every number and quality. 22 13*

MACHINISTS' TOOLS.—Meriden Machine Co have on hand at their New York Office, 15 Gold street, a great variety of Machinists' Tools, Hand and Power Punching Presses, Forcing Pumps, Machine Belting, &c., all of the best quality. Factory West Meriden, Conn. 17 13*

W. P. N. FITZGERALD, Counsellor at Law—late Principal Examiner in the U. S. Patent Office—has removed from Washington, D. C. to the city of New York, 271 Broadway, (corner of Chambers St.) As heretofore, his practice is confined to Patent Cases, which he will prosecute or defend, as counsel, before the Supreme and Circuit Courts of the United States, also before the Patent Office, or the Judges having jurisdiction of appeals therefrom. 11tf

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N. B.—Reliable orders filled for any part of the United States and Europe. 16tf

NORCROSS ROTARY PLANING MACHINE.—The Supreme Court of the U. S., at the Term of 1853 and 1854, having decided that the patent granted to Nicholas G. Norcross, of date Feb. 12, 1850, for a Rotary Planing Machine for Planing Boards and Planks is not an infringement of the Woodworth Patent.

Rights to use the N. G. Norcross's patented machine can be purchased on application to N. G. NORCROSS,
208 Broadway, New York.
Office for sale of rights at 208 Broadway, New York Boston, 27 State street, and Lowell, Mass. 19t

GRAIN MILLS—EDWARD HARRISON, of New Haven, Conn., has on hand for sale, and is constantly manufacturing to order, a great variety of his approved Flour and Grain Mills, including Bolting Machinery, Elevators, complete with Mills ready for use. Orders addressed as above to the patentee, who is the exclusive manufacturer, will be supplied with the latest improvements. Cut sent to applications, and all mills warranted to give satisfaction. 10tf

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Science and Art.

Measuring Falling Water.—No. 2.

[Concluded from page 216.]

From the many experiments made to ascertain the amount of water passing through notches in a given time, 6-10th, of the theoretic quantity may be taken for common practice, so that by the rules we have given, any person may easily calculate the power of any body of water passing through an orifice, or notch.

Templeton's Rules to ascertain the quantity of water flowing under a sluice and over a weir, in a second, are as follows:—"If the water flows under the sluice, multiply the square root of the depth, in feet, by 5·4, and by the area of orifice also in feet, and the product is the quantity of water discharged in cubic feet per second. If the water flows over a sluice or weir, multiply the square root of the depth in feet by 5·4, and two-thirds of the product, multiplied by the length and depth, also in feet, gives the number of cubic feet discharged per second, nearly.

Required the number of cubic feet per second that will issue from the orifice of a sluice 5 feet long and 9 inches wide, and 4 feet from the surface of the water. $2\times5{\cdot}4=10{\cdot}8$ velocity, and $5\times{\cdot}75\times10{\cdot}8=40{\cdot}5$ cubic feet per second."

This quantity of water, multiplied by 60×4, and 62·5; then divided by 33,000 will give the horse power of the water.

The following is the formula of Wm. Blackwell, given in a paper read by him on the subject before the London Institution of Civil Engineers, May 6th, 1851: $V2gH\times lH\times m$. Q is the discharge of cubic feet per second, $2g=64{\cdot}3$—the effect of gravity. H is the head in feet; lH is the section of steam, and m is the co-efficient of correction.

This is like the one given in the article last week.

We have the letters of three millwrights before us, all of whom agree in the use of the particular formulæ and rules given as applied to estimate the quantity of falling water through orifices, and its power. Their rule is to multiply the square root of the head by 8·5 for the velocity of water in feet per second; reduce this to inches, and multiply it into the area of the orifice in inches, for the quantity of water in cubic inches; which, divided by 1728 gives the amount in cubic feet falling in one second. Multiply this by 60 seconds, and 62·5 lbs., which will give the weight of water in lbs. per minute. The resultant, multiplied by the hight of the fall, and divided by 33,000 gives the horse power of the water. Thus,—What is the power of water passing through an orifice of 500 square inches under a six foot head? The velocity of the water operating through an orifice under such a head, one letter says, is 19 8-12 feet per second; the other says 17·5 feet per second. We will take the highest velocity (from a letter of A. P. Torrence, Oxford, Ga.,) 19·8-12×12 (inches in a foot) $=236\times500$ (area of discharge) $=118{,}000\times60$ (seconds in a minute) $=7{,}080{,}000$ (cubic inches of water per minute) $\div1728$ (cubic inches in a foot) $=4097$ 1-4 (cubic feet of water per minute ($\times62$ 1-3 (lbs. in a foot) $=255{,}194$ lbs. of water falling 6 feet in one minute; $255{,}194\times6$ (distance fallen$=1{,}531{,}164\div33{,}000=46$ 1-3 horse power, from which if 25 per cent. be deducted, a good wheel, propelled by such water, will yield 34·5 horse power. With such a fall, and such an area of orifice, Messrs. Collins & Gilbert, of Troy, N. Y., state they build water wheels warranted to give out more than thirty horse power. These rules are those commonly used by our millwrights.

The factor 5·4, given by Templeton, embraces the co-efficient of correction used by most millwrights; but some use the factor 5·1 which we think is most correct; it embraces the corrective co-efficient ·6, given in the article last week, when 8·5 is used as the multiplicand for the effect of gravity. Thus what is the velocity of water per second flowing under a 4 foot head? $V4\times8{\cdot}5\times{\cdot}6=10{\cdot}2$; also $V4\times5{\cdot}1=10{\cdot}2$ ft. This shows the harmony of the two methods.

In these articles our object has been to present rules which are in common use, and such information connected with them as is not generally known. Our desire is to have such information free from error, so that it can be depended upon. We will again give the method of calculating the horse power of a certain quantity of water, to correct an error of a figure on page 208, in the amount of water.

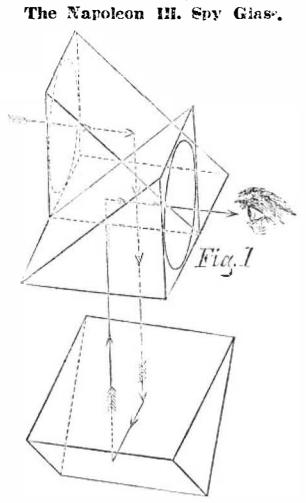
What is the horse power of 40 cubic feet of water passing over 6 foot fall every second? $40\times62{\cdot}5\times6\times60\div33{,}000=27{\cdot}27$. From this deduct one-fourth, for loss by friction, &c., and the actual power is 20·46; or, by the old allowance, one-third, and the actual power is 18·18 H. P.

We have been thus particular and minute in order that persons who have falls of water, may be able to calculate their power for themselves.

An engineer, in this city, informed us that he erected a steam engine of twenty-five horse power in a factory at Greenfield, Conn., and yoked it to the main shaft which had been driven by a breast wheel stated to be seventy horse power. The water was shut off from the wheel, and the engine (not working above the rated power) drove the whole machinery, turning the water wheel also. This surprised him, for the water wheel of 70 horse power had not been able to do more than drive the machinery in the factory. He came to the conclusion that the common method of calculating the horse power of water—as compared with the steam engine—was wrong, and he reasoned thus:

"Supposing there is a fall of water 16 feet high, with an orifice of two square feet (24×12 inches,) letting on the water to an overshot wheel; only 32 cubic feet of water will merely be discharged per second, which, by the common rules of calculating, would give no less than 68 cubic feet. By the law of falling bodies, a molecule of water will fall in a trunk from zero through 16 feet in a second, and no more; true, it will have attained a velocity of 32 feet at the end of the second, but its average velocity from zero is only 16 feet per second; that is, a trunk of water 16 feet deep, with an open bottom, will only discharge its contents once every second. This quantity, multiplied into the hight of the trunk, for the pressure, is the real horse power."

The Napoleon III. Spy Glass.



The above is the name given to an ingenious contrivance by its inventor, Mr. I. Porro, a retired officer of the Piedmontese military engineers. We condense the following description from the Paris *Illustration.*

The improvement consists in so arranging a series of prismatic lenses that the larger portion of the spy glass may be placed in a vertical case; as, for example, in the head of a cane. Convenience in holding, traveling, and economy of space is thus secured, while the power of the spy glass is, in some respects, improved.

A short instrument, like that shown in fig. 2, when held in the hand, is less liable to oscillation, and enables the observer to point it correctly and steady, and to measure by means of an *ocular micrometer* the distance to a given point, whenever the absolute size of the body observed is known, and *vice versa;* it is also very convenient for transportation, making a pocket instrument without the usual sliding tubes, which prevent a correct centering of the lenses.

This spy glass consists of an objective rectangular prism, fig. 1, ground in the shape of a lens on one of its catheti, and throwing back below, by reflection on its hypothenuse, the horizontal rays from the exterior body observed. These rays meet a second rectangular prism, where, by the last reflection, they are thrown on the ocular or anterior cathetus, also shaped like a lens. The distance between

the objective glass and the eye is consequently but the thickness of a prism, (hardly two inches,) the real length of the apparatus becomes vertical, is hidden inside of the handle, which affords the observer a means to hold it in a steady position. The arrows indicate the direction in which the rays of light are reflected. The exterior shape, fig. 2, is very handy, not liable to get out of order, and the whole is quite portable, and the instrument very powerful. A is the eye glass. B thumb screw for regulating the focus. The greatest difficulty the inventor had to contend against was to obtain perfect achromatism; in this, we are told, he has fortunately succeeded perfectly: his instruments are as free from colored spectra and aberration as the most perfect spy glasses constructed in the ordinary manner. A small micrometer is also adapted for the purpose of computing distances. The inventor has secured patents in France, and other European countries.

[For the Scientific American.]

Safety Life Ships.

Messrs. Editors—The daily press having spoken upon the subject of safety at sea, it is but reasonable to suppose that there are many like myself who believe that your paper—the most widely-circulated mechanical and engineering journal in the United States—should also show the absurdity of sending ships to sea with no other protection against foundering than the shell of the vessel. We have heard of bulkheads until the subject has become as common-place as a household word, but we seldom pause to inquire what kind of bulkheads are meant.

The common sense of ship owners and masters has caused them to abandon the lumbering wooden tank for holding water in a ship's hold, substituting iron, because iron tanks were stronger, less bulky, and more durable than wood; and yet, strange to say, they build wooden bulkheads around the engines and boilers of an ocean steamer; in other words they build boxes of iron to hold water, and of wood to hold fire; and this we are called upon to regard as an improvement. Will the common sense of this commercial community lead them to expect that these longitudinal and transverse bulkheads around the engines and boilers can be kept water-tight, even though they were calked at the termination of every voyage?

It is fearful to contemplate how horror-stricken the unfortunate passengers and crew would be in case of a rupture like that of the *Arctic*, to find that the leak through the seams of the bulkheads was scarcely less than those of the vessel itself. It is high time the traveling public looked to their own safety, and resolved to take passage in no steamer that has the bulkheads around their engines of wood, to become a tinder-box in case of fire, and a seive in case of flood. These bulkheads should be of plate-iron, extending from the ceiling to the lower deck, and be made water-tight; then, and not until then, will the ocean traveler feel that he is secured against the dangers of the ship, which are sometimes even greater than those of the sea.

New York. A Ship Builder.

Mr. Mechi, the celebrated English farmer, affirms that every farmer who cultivates a farm of two or three hundred acres without the use of a steam-engine has a great lesson to learn in agricultural economy.

Literary Notices.

The Annual of Scientific Discovery for 1856—D. A. Wells, the editor, has, in this volume, given us another choice and excellent epitome of the progress of science and invention during another year. The editorial notes are excellent, and the selections exhibit an extensive acquaintance with the subjects treated. It is divided into various distinct parts, under which certain discoveries are described. The chapter devoted to the mechanics is unusually large and replete with accounts of new inventions. The chapter devoted to chemical science also contains a great amount of information useful to every person in every rank of life—the mechanic, merchant, and laborer, as well as the chemist. There are also separate chapters devoted to Natural Philosophy, Geology, Astronomy, Geography, and Botany, in each of which there is much to instruct and interest the reader. Dr. Wells possesses great tact, discrimination, and industry in preparing such a work as this; and we do not know of a single annual more useful for families than this. It is a neatly printed volume, containing about 400 closely printed pages, and is illustrated with a steel plate of Col. Richard M. Hoe, of this city. Published by Gould & Lincoln, Boston, and Geo. P. Putnam & Co., this city.

The College Review—This magazine for the present month has a long and able article on "Debating as a means of educational discipline." The other articles are very good, especially one devoted to the Public Schools of New York City. The editors of this Review are Absalom Peters, D.D., associate S. S. Randall. The latter may have a predilection in favor of the schools which he superintends, but we assure him they require a thorough reformation. The scholars in our Public Schools are compelled to study too many different subjects at once. Girls and boys of nine and ten years of age are scarcely able to carry to and from school the quantity of books they have to study. They learn a little of everything superficially, and nothing well. N. A. Calkins, 348 Broadway, Publisher.

The Edinburgh Review—This periodical is the oldest of the British Quarterlies, and maintains a reputation second to none and equalled by few. The number for this quarter—just issued by its enterprising publishers L. Scott & Co., 54 Gold st.—is an excellent one. It contains ten original essays, the first of which is on the "Civil wars of Cromwell," and the last one on the "Russian campaigns in Asia." This number commences a new volume—a good time for subscribing by those who wish to become acquainted with British criticism.

The United States Magazine for this month contains an elaborate article on the manufacture of fire-proof safes, illustrated with a number of wood cuts. Published by J. M. Emeson & Co., No. 1 Spruce st.

The Quarterly Law Journal—This able Review for this quarter contains a very able essay on "Legislative Tinkering." The other articles are also excellent. It is edited by A. B. Guigon, and published by J. W. Randolph, Richmond, Va.

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